Chemical Week

July 6, 1957

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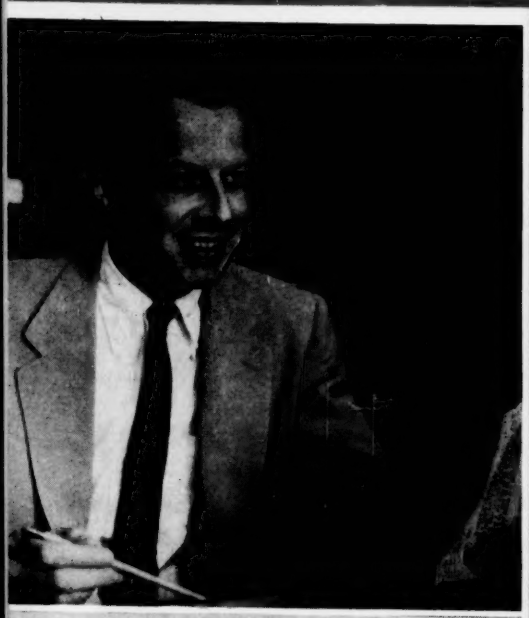

First detailed look at controversial Senate report on chemical industry concentration . . . . . p. 21

Process equipment prices rise, buoyed by last week's $6/ton steel hike . . . . . p. 40

M&T's Hirschland: His chemists are cultivating a crop of promising new organo-tin chemicals . p. 50

1960's nitric demand could dwarf today's whacking 3.7-million-tons/year capacity . . . . . p. 46

Central Los Angeles. It poses problems for process plants, but they like it there . . . . . p. 30

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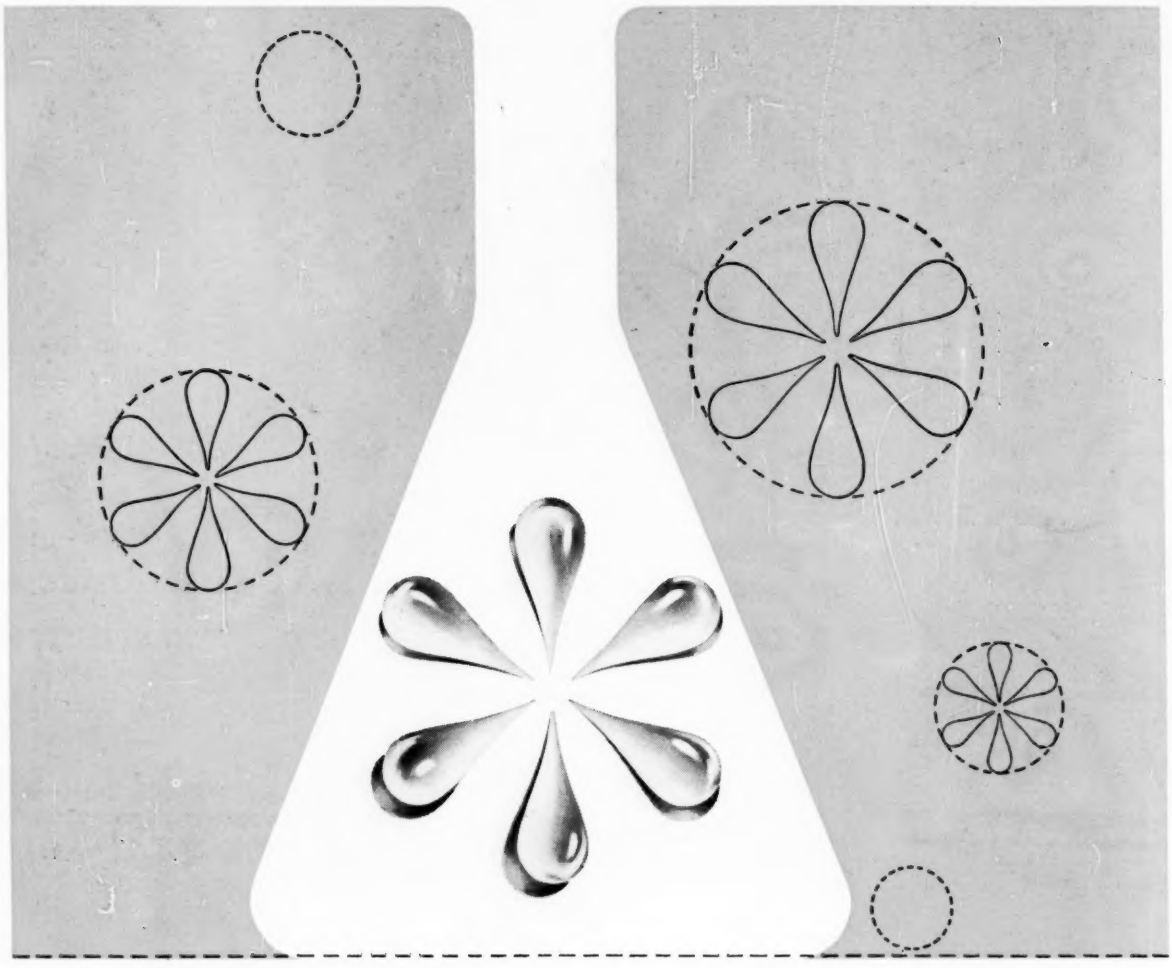

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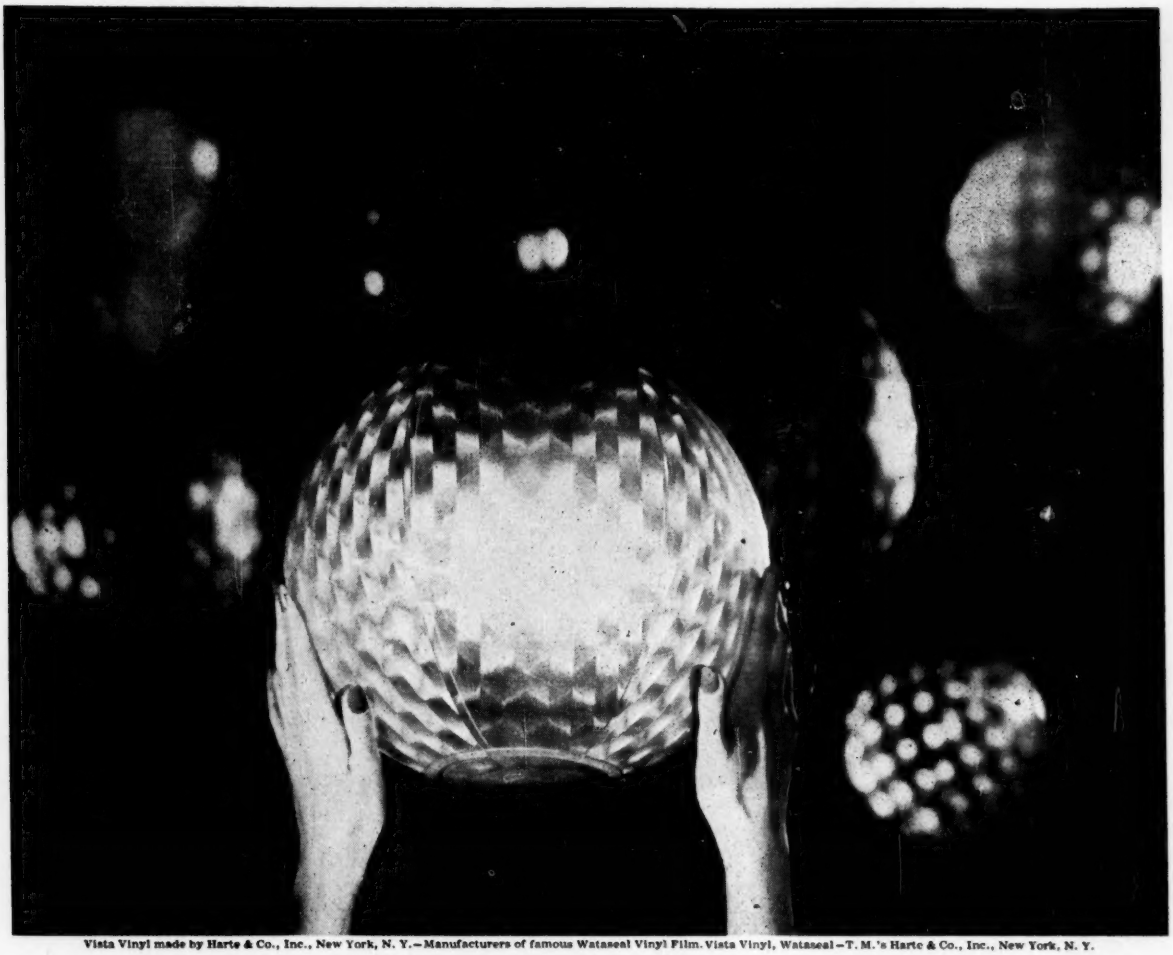

Vista Vinyl made by Harte & Co., Inc., New York, N. Y.—Manufacturers of famous Wataseal Vinyl Film. Vista Vinyl, Wataseal—T. M.'s Harte & Co., Inc., New York, N. Y.

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Worlds of new possibilities for permanently attractive products made of vinyl film or sheeting have been opened up by the beach balls pictured above. They're made of a revolutionary new vinyl film which presents not only a striking three-dimensional appearance, but never-before-achieved fluorescent colors as well.

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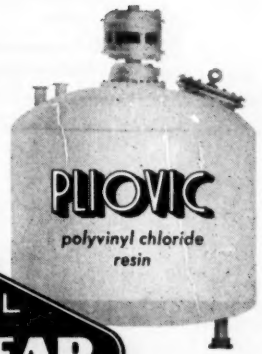

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Chemical Week

TOP OF THE WEEK

July 6, 1957

- **Carbide will build 150-million-lbs./year ethylene oxide unit** at its Charleston, W.Va., chemical complex ..... **p. 24**
- **Nylon-in-water dispersions come of age;** easily applied materials will find use in metal paints, paper coating ..... **p. 57**
- **New advertising research project could show** chemical firms how to get more sales from advertising dollars ..... **p. 64**
- **Chlorine without caustic may finally be economical,** if new wrinkles in classic process prove out ..... **p. 74**

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25 Revlon moves to take over Schering, buys 9% stock interest in open market.

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Steel prices go up this week. How will chemical equipment prices be affected?

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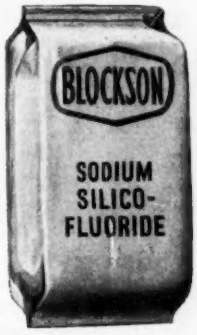

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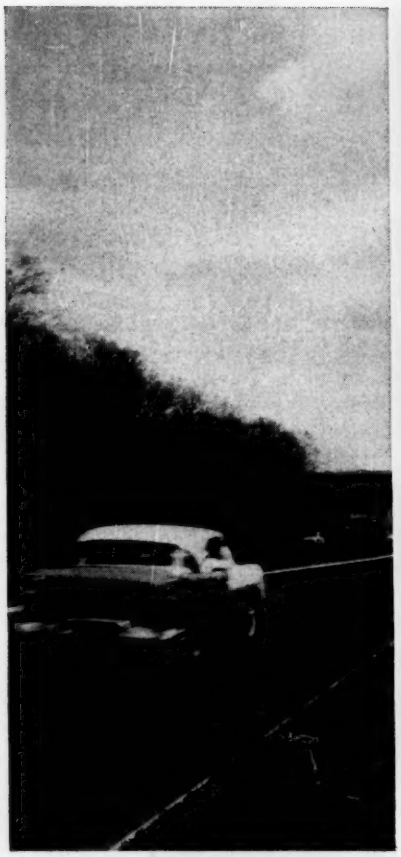
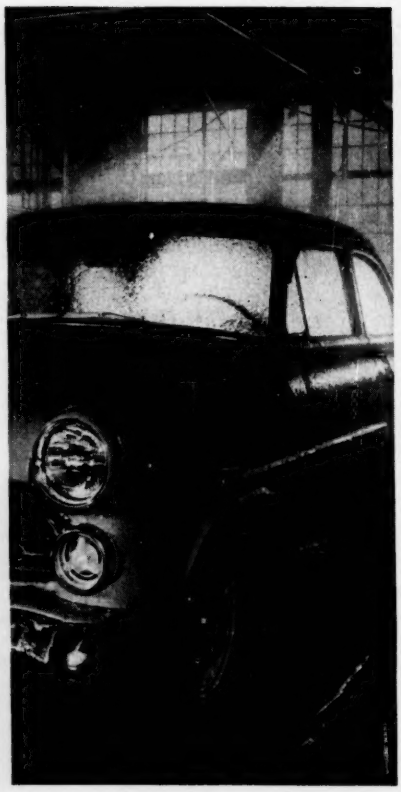


BLACKOUT ON WEAR

Tire treads must be tougher as wheel diameters become smaller and superhighway driving increases. Tire life and dependability are keeping pace with this challenge through the use of Witco-Continental carbon blacks. Continental Carbon Company.



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The "one-minute" car wash puts a premium on quick wetting, thorough detergency and dirt-removing action in car-wash detergents. Ultra's SULFRAMIN® E Liquid is ideal because of its high-powered detergency backed by dirt-lifting foam and excellent rinsability. Ultra Chemical Division.

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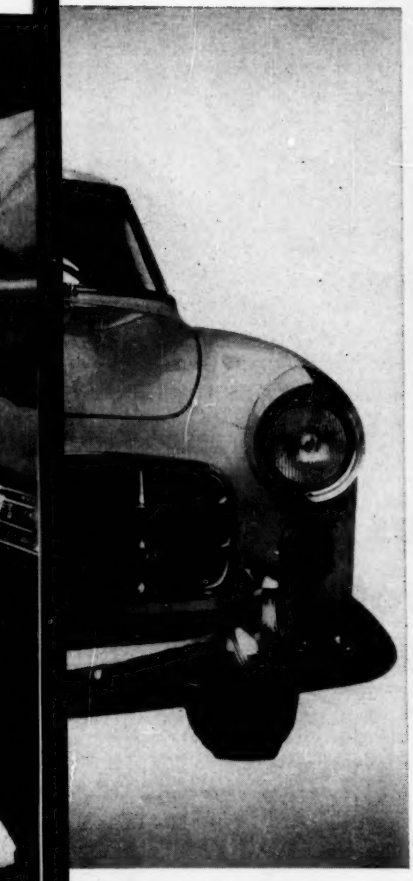
Fine-celled foams are essential t the quality of urethane product such as this safety padding for dash boards. Formulated by Witco specifi cally for urethane applications FOMREZ* 50 Polyester Resin pro duces foams of excellent appearanc and performance.

Cars look and ride better... are safer...because Witco Chemicals do their part



BEHIND THE GLEAM

igh-quality chrome plate or enamel nishes depend on a completely ean metal base. On car bumpers d body panels, Emulsol's EMCOL nulsion-degreasing detergents onomically remove all oil and ease to leave a spotless surface r plating or spraying. *For details degreasing with* EMCOLS, *write r Bulletin No. 38.* Emulsol Chemi- l Division.

PROTECTION BELOW

Deadening road noise and preventing corrosion, Pioneer Automotive Undercoaters add to both riding comfort and car life. Pioneer's wide range of specialty bituminous products also protect and insulate storage tanks for petroleum products. Pioneer Products Division.

Gleaming enamel and chrome, comfortable cushions, safety padding and tough tires to ride on...Witco products contribute to each of these areas of car-riding pleasure and safety.

Yet this is just *one* field in which Witco products are doing their job *well.* One or more of the chemicals from Witco's 14 plants may benefit *your* process or product, and we would welcome the opportunity to discuss them with you.

37 Years of Growth

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Emulsol

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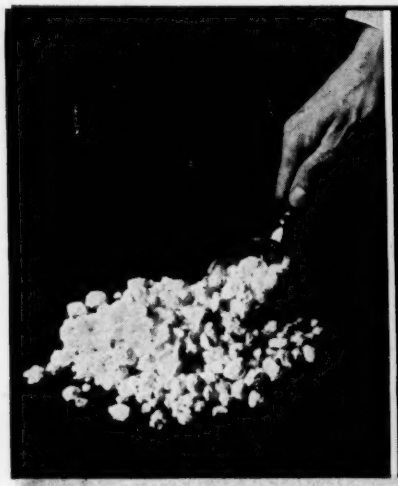
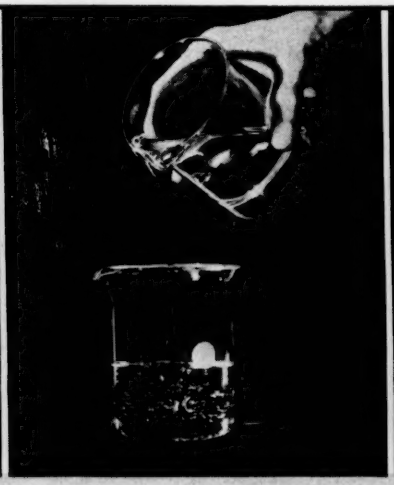
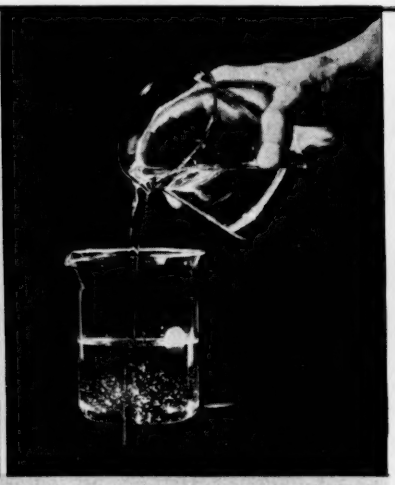


Crystalline sorbitol is available in pellets as shown here, or in powder form, less than 1% moisture.



ARLEX, Atlas industrial humectant solution, is non-crystallizing; viscosity is 16 times that of SORBO.



SORBO 70% sorbitol solution is most economical, high purity product—meets N. F. Specifications.

Choose the conditioner qualities *you* need from the line of ATLAS sorbitol products

When you're making a product that needs plasticizing or protection against moisture changes, you're likely to find the right combination of performance, properties and price in the family of sorbitol products that Atlas makes. If you make confections, cosmetics, liquid pharmaceuticals, adhesives, tobacco, printer's rollers, or inks—one of the following products will probably match your requirements and save you money. Any of the four may be used alone or in combination with sugar systems, glycerin or the glycols.

For high purity at lowest cost

SORBO®—*70% sorbitol solution*—is the sorbitol product we usually recommend for use in confections and pharmaceuticals, as well as most other industrial applications. It's our top purity sorbitol liquid product, and at the same time our lowest priced. It meets the Toilet Goods Association standard. And it's the original sorbitol product meeting National Formulary specifications.

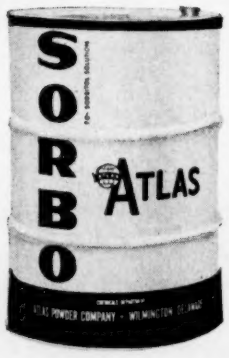
During our more than 20 years of manufacturing sorbitol, we have constantly refined manufacturing techniques to assure you of getting high purity, and getting it *all the time*. Extreme uniformity is assured because SORBO is made by a *continuous process*, under SQC (statistical quality control) methods—Atlas being a pioneer in the application of these methods to chemical-making.

For increased resistance to crystallization

Sorbitol Special is often recommended where you need extra resistance to crystallization, as compared to the purer and more economical SORBO . . . for example where the humectant plasticizer spreads over a surface as in conditioning paper or fiber. Sorbitol Special is a 76% solution of sorbitol and its anhydrides, the latter increasing solubility and lessening crystallizing tendency. Its viscosity is almost three times that of SORBO.

For extreme conditions

ARLEX® is our non-crystallizing industrial humectant solution, recommended for extreme conditions of use where greatest resistance to crystallization is required. It is an 83% solution of sorbitol, its anhydrides and other polyhydric derivatives of sorbitol. Its viscosity is over 16 times that of SORBO.



SORBO *and other Atlas sorbitol solution products are supplied in 55-gallon lined steel drums—also in 1 and 5-gallon cans, and in tank cars.*

For compounding

Crystalline sorbitol, in powder or pellet form, is used principally for chemical synthesis, tableting and compounding, rather than conditioning. It is similar to SORBO in purity, but has less than 1% water content.

Technical assistance by Atlas can help you determine which of these products best fits your requirements. Our many years of pioneering experience are ready to serve you in applying these versatile materials to hundreds of uses. Write for data, samples and consultation.

DEVELOPING NEW FOOD PRODUCTS?

See Atlas for help on emulsifying and conditioning

Creating distinctive improvements in new food products . . . in palatability, texture, keeping qualities, whipping or dispersion . . . often brings you a problem of emulsification of fats and oils, or conditioning of mixed sugar and starch systems. When you hit one of these problems, we're the people to see.

Our specialized experience and facilities can bring you closer to the answer to your emulsifier and conditioner questions. We'll do the basic materials chemistry, screen out trial materials by application or "kitchen" tests, and turn over the most promising materials for your development staff to work with.

You gain by our chemical experience . . . as a leader in the development of polyols, surfactants and conditioners for such varied industries as agricultural chemicals, cosmetics, pharmaceuticals, detergents, textiles, foods and others. Among the contributions we have made in this field are the introduction of high stability W/O emulsifiers, the blending of emulsifiers to cover a wide range of applications, and the HLB numerical system for selecting surfactants.

You gain by our food experience. Our laboratory facilities, unusual among food ingredient manufacturers, and our experienced food technologists enable us to undertake application studies and pilot processing on many varied food products.

Write for a consultation on your problem—you may be able to find the answer more quickly through working with Atlas.

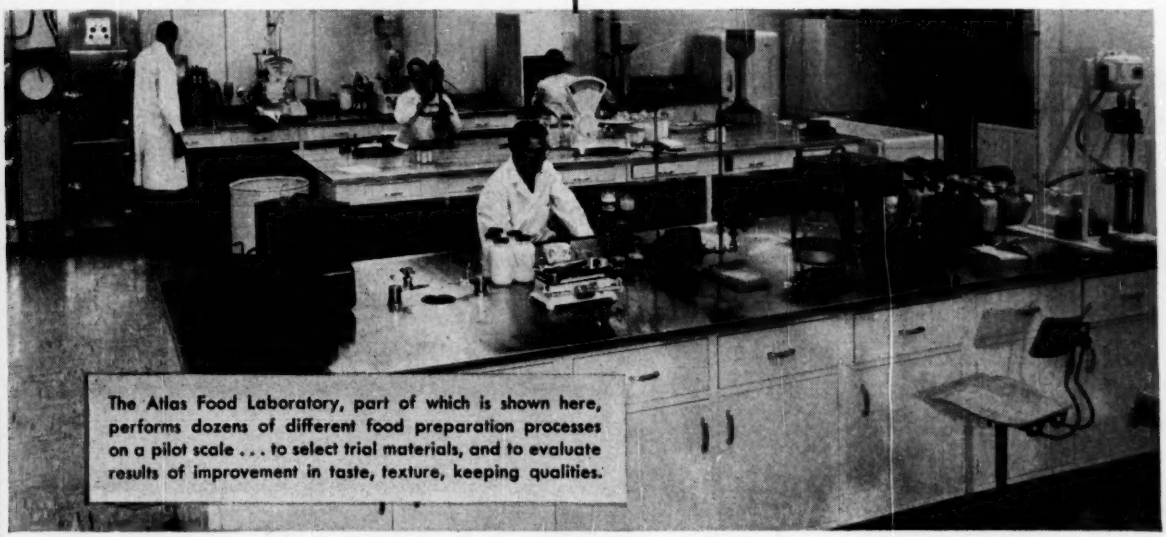
TAKE A TIP FROM YOUR DRYCLEANER

When you need to purify a product, how do you tackle the job? There are at least four methods . . . distillation, crystallization, precipitation and adsorption. The trick is to know which best fits your situation.

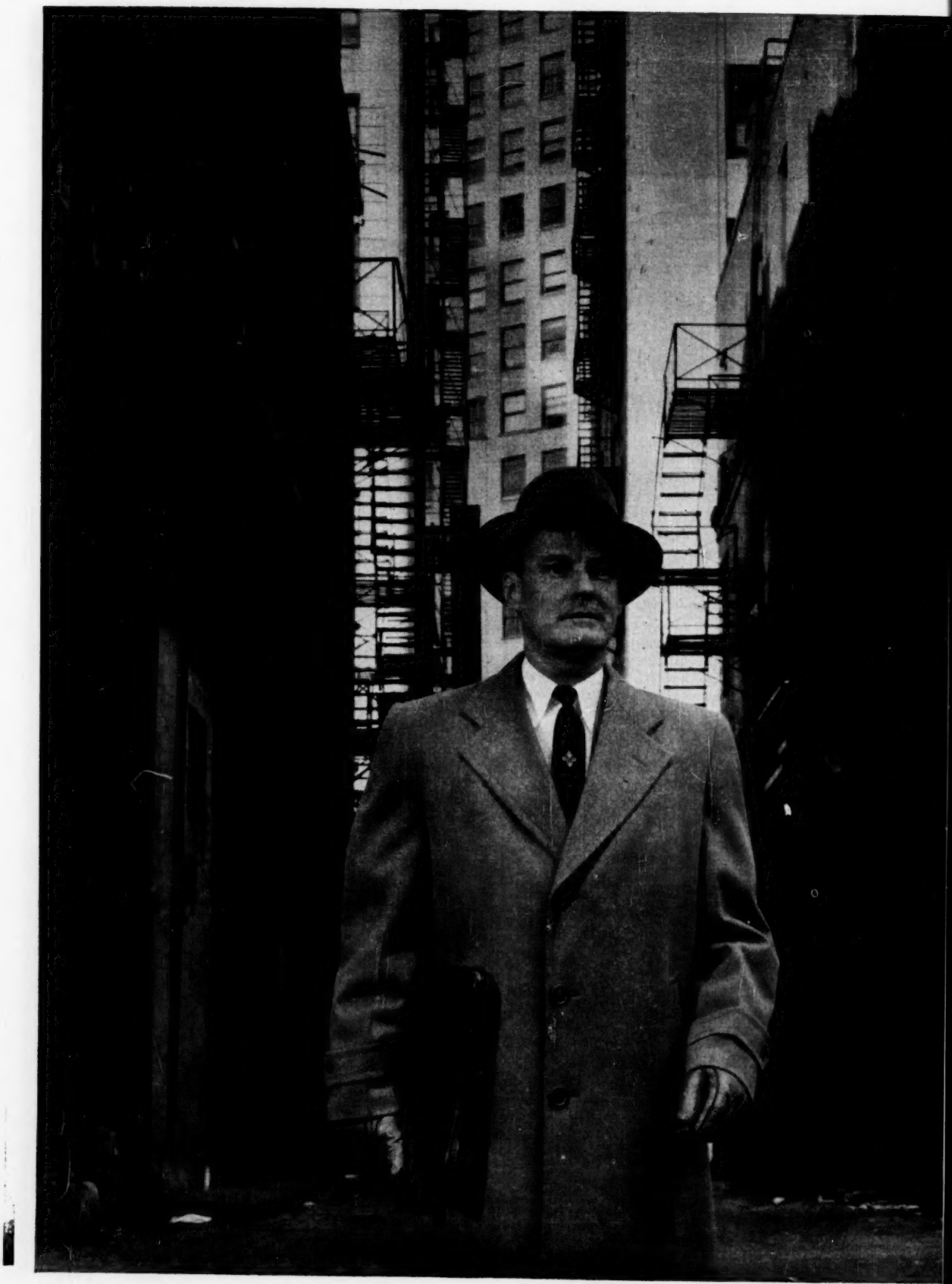
Here's how drycleaners solve the problem. The solvent that they use to clean your clothes accumulates all kinds of impurities during a day's cleaning work. It becomes loaded with fatty acids, dyes, odors, greases. And since you can't clean with dirty solvent, the impurities have to be removed . . . solvent being too expensive to throw away.

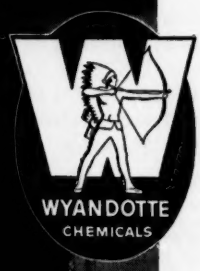
Leading drycleaners circulate their solvent continuously through a filter that is charged with DARCO® DC . . . a special grade of DARCO that we make for cleaners. As the solvent goes through the filter, DARCO DC adsorbs the various odors, colors and soil released from the garments in the washer. The result: solvent stays clean, and garments come out bright and fresh. And the whole operation costs just a few cents a day.

The moral of this story is that when you have trace impurities to remove, think of DARCO activated carbon. We've been helping people put this idea to work for many years. How about writing us about your particular problem?



The Atlas Food Laboratory, part of which is shown here, performs dozens of different food preparation processes on a pilot scale . . . to select trial materials, and to evaluate results of improvement in taste, texture, keeping qualities.





Should a chemical manufacturer go in the back door and sell direct to its distributors' customers?

The answer is NO!

It is true that there are cases when users of chemicals in less-than-carload lots become so large that chemical distributors cannot properly or profitably service them.

Even then, the manufacturer should not "go in the back door." He should discuss the situation with the distributor. Chances are the distributor will have called this to his attention first.

Mutual cooperation is the only way in which manufacturer and distributor can grow.

The manufacturer supplies distributors with many new prospects. Through advertising, new products, research, and technical service, he helps distributors to get and keep new customers on which to expand their business.

We, at Wyandotte, want our distributors to have all the customers they can handle. We spend thousands of dollars annually to obtain customers with less-than-carload needs for our distributors.

Our distributors fully understand our position and appreciate our efforts. We believe this is in the best interests of both our distributors and their customers.

Wyandotte CHEMICALS

MICHIGAN ALKALI DIVISION

WYANDOTTE CHEMICALS CORPORATION, WYANDOTTE, MICHIGAN

Offices in Principal Cities

OPINION

Move It Eastward

TO THE EDITOR: Noticed *(April 27, p. 39)* that Champion Paper & Fiber Co. is adding a new chemical recovery smelter and precipitator to its Pasadena, Calif., plant. In reporting this information to our California people, we were informed that no such concern is located in Pasadena, Calif., and that there is no thought of developing this type of industry there.

Would appreciate if you can develop whether our people have not gotten the full story or possibly the article in your magazine was in error.

G. W. Cox
Assistant to the President
The Atchison, Topeka & Santa Fe Railway
Chicago

Indeed we were. It should have read Pasadena, Tex.—ED.

AEC Comments on Zr, Hf

TO THE EDITOR: Reference is made to the article on the separation of hafnium from zirconium *(Feb. 2, p. 58)*.

I take this occasion to make several comments, as follows:

1. The inventor of the separation process is Ivan E. Newnham, of the Division of Industrial Chemistry, Commonwealth Scientific and Industrial Research Organization, Melbourne, Australia.

2. John E. Cummins, scientific attache, Australian Embassy, arranged for Newnham's meeting with R. Carson Dalzell (chief, engineering development branch) and the writer on Sept. 11, 1956. Newnham turned out to be very well informed and quite sure of his results. His one-cycle product was somewhat better than that presented in the article.

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: H. C. E. Johnson, Chemical Week, 330 W. 42nd St., New York 36, N. Y.

3. Variations in the Zr/Hf ratio during processing had been observed some years ago, but Newnham's plan is the first that appears attractive for use in production. The remaining problem is in the engineering.

4. The first large-scale separation by the thiocyanate-hexone method was done at the Y-12 plant at Oak Ridge, Tenn. This was later used at the Bureau of Mines plant at Albany, Ore., and then at Carborundum Metals Co. (Akron, N. Y.). National Research Corp. plans to use the tributyl phosphate separation.

5. Other processes that have been considered seriously by several prospective producers are:

(a) Silica gel process.

(b) Fractional crystallization of potassium zirconium fluoride (Kawecki Chemical Co.). This would tie in nicely with a fluoride electrolysis production method (Horizons Incorporated).

6. Newnham's iodide cycle would tie in nicely with the deBoer process, which is at present dormant, except for hafnium sponge purification. For zirconium sponge production, the chloride cycle should prove to be more interesting.

FRANK KERZE, JR.
Chief, Chemical Engineering
Division of Reactor Development
U. S. Atomic Energy Commission
Washington, D.C.

Patent Pitfalls

TO THE EDITOR: Please add this one to the many letters I know you will receive anent your article "Pitfalls of Patent Delay" *(June 1, p. 26)*.

We have already received calls from two of our clients who are subscribers of your periodical concerning this article. This article is misinformative concerning a highly important principle of patent law on which the decision of the case turned. The point is that an applicant is given one year from the time of a first public use or sale of the patented commodity in which to file his application; it is not necessary that the application be filed before the commodity or method is sold or used.

I feel that your article will tend to induce the filing of applications on a large number of half-baked ideas to avoid loss. This is precisely what our greatly overburdened Patent Office does not need.

LAWRENCE H. COHN
Cohn, Powell & Cassidy
St. Louis, Mo.

A good point. Patent applicants may use their ideas for a year prior to application without fear of losing their patents. The article failed to mention that U. S. Chemical had put the idea into "public use" for more than a year prior to their application. The point of the article, however, is that a company cannot plead that it was only experimenting and testing its idea as a defense against the contention of public use.—ED.

MEETINGS

British Plastics Exhibition and Convention, Olympia London Grand & National Halls, London, July 10-20.

Denver Research Institute, Metallurgy Division, 6th annual conference on industrial applications of X-ray analysis, Albany Hotel, Denver, Aug. 7-9.

American Society of Mechanical Engineers and American Institute of Chemical Engineers, first national conference on heat transfer, Penn State University, University Park, Pa., Aug. 12-15.

Northwestern University conference on liquid scintillation counting, Technological Institute, Evanston, Ill., Aug. 20-22.

American Soybean Assn. and National Soybean Processors Assn., annual meeting, Leamington Hotel, Minneapolis, Aug. 26-28.

Fisk University, 8th annual infrared spectroscopy institute, Nashville, Aug. 26-30.

Instrument Society of America, international symposium on gas chromatography, Kellogg Center for Continuing Education, East Lansing, Mich., Aug. 28-30.

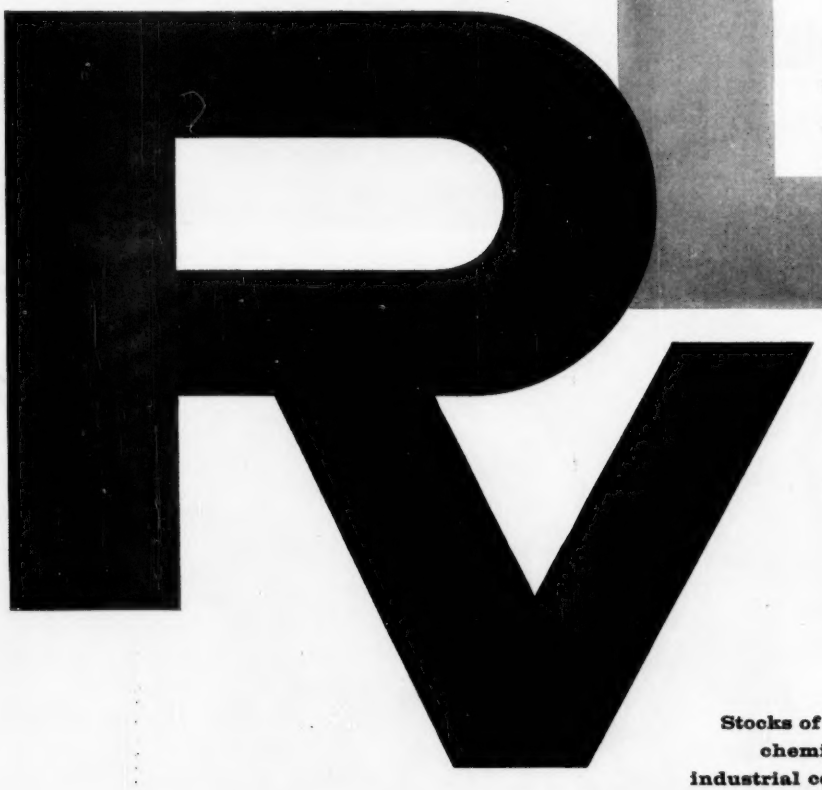
National Agricultural Chemicals Assn., annual meeting, The Essex and Sussex, Spring Lake, N. J., Sept. 4-6.

Instrument Society of America, 12th annual instrument automation conference and exhibit, Cleveland (O.) Auditorium, Sept. 9-13.

Technical Assn. of the Pulp and Paper Industry, testing conference, Hotel Shoreham, Washington, Sept. 11-13.

International Union of Leather Chemists Societies, 5th conference, Rome, Italy, Sept. 15-20.

FOR THE PAINT, VARNISH AND LACQUER INDUSTRY



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isopropyl acetate

n-butyl acetate

isobutyl acetate

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cellulose acetate

cellulose acetate butyrate

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dimethyl phthalate

diethyl phthalate

di-(methoxyethyl) phthalate

dibutyl phthalate

di-isobutyl phthalate

plasticizer 24
–an octyl butyl phthalate

dioctyl phthalate (DOP)

di-isooctyl phthalate (DIOP)

dinonyl phthalate

polymeric plasticizer NP-10

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Life on the Chemical Newsfront

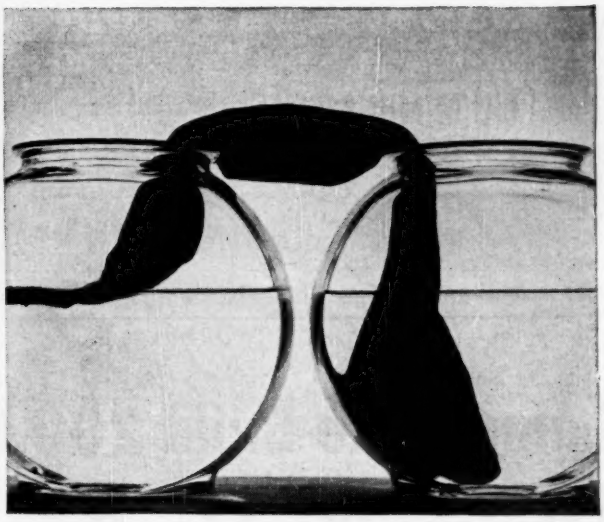
LASTING BEAUTY and liveliness that stays lively are qualities of rubber products made with Cyanamid's UNITANE® Titanium Dioxide. Thorough purification and careful controls imposed in manufacture give UNITANE Titanium Dioxide good whiteness, high brightening strength and excellent aging characteristics. White whites and bright pastels are assured by UNITANE Pigments. **(Pigments Division)**

RICHER LATHERING OF LIQUID SOAPS in hard water is made possible by Cyanamid's CYQUEST* 40 Sequestering Agent. By sequestering heavy metal ions CYQUEST 40 protects against the formation of un desirable insoluble soaps and insures sparkling clarity of soap formulations even after extended storage. CYQUEST 40 Sequestering Agent is a 40% solution of the tetrasodium salt of ethylene diamine tetra acetic acid, generally recognized as the sequestrant forming the most stable heavy metal ion complexes. **(Industrial Chemicals Division, Dept. D)**

*Trademark

A NEW BIFUNCTIONAL ACRYLONITRILE DERIVATIVE, potentially low in cost, has been announced by Cyanamid. Now available in research quantities, β-sulfopropionitrile could be produced on a commercial scale at a price in the bulk chemical range. Melting at 243-244° C, soluble in water, hot methanol and glacial acetic acid, this interesting chemical combines the functionality of the nitrile group and the sulfonic group. If you are curious to find what you can do with it, send for data sheet and sample. **(New Product Development Dept. D)**

FRESH FISH 3000 miles from its source is a reality in Canada. Now diners in Vancouver, B. C., can enjoy Atlantic Ocean varieties shipped across the continent. Making this possible is Cyanamid's ACRONIZE® Chlortetracycline. Added to the fillet dip tank, it greatly retards deterioration and maintains the delicate fish flavor through many days. ACRONIZE Chlortetracycline has been used in the United States for two years to extend the freshness of poultry, and the application to fish has just received approval in Canada. **(Farm and Home Division)**



THIS "FISHBOWL TEST" graphically demonstrates the powerful wetting action of DECERESOL® Wetting Agents. The tank on the left contains plain water, and the tank on the right contains water with 0.025% DECERESOL Wetting Agent. Plain water hardly wets the fabric, which continues to float, while the treated water wets rapidly, causing the fabric to sink quickly. The rapid wetting action of DECERESOL Wetting Agents, which are stable through a wide pH range, aids greatly in such textile treating operations as desizing, bleaching, dyeing and finishing. They do not affect the appearance or feel of the treated fabrics.

(Organic Chemicals Division)

TWO NEW IMPACT-RESISTANT COATING RESINS for metal finishes have been introduced to the paint industry. CYZAC* 1006 and 1007 Resins provide an unusual combination of properties in enamels for metal: maximum hardness with much greater impact and chemical resistance than conventional finishes. Among expected major uses are finishes for metal toys, appliances, automobiles and metal cabinets and furniture. Other properties imparted by these resins are flexibility, high gloss and gloss retention, unusually good enamel stability and better adhesion.

*Trademark **(Plastics and Resins Division)**

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LUMMUS

ENGINEERS AND CONSTRUCTORS FOR INDUSTRY

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Lummus to Build 200,000,000 lb. per Year Ethylene Plant for Petroleum Chemicals, Inc.

Installation Designed for 50% Expansion

The Lummus Company is presently designing and will build for Petroleum Chemicals, Inc. at Lake Charles, Louisiana a plant to produce 200,000,000 pounds per year of ethylene. Scheduled for completion by the end of 1957, the plant is designed to permit expansion of output to 300,000,000 pounds.

The plant will use Lummus' ethylene process and will draw refinery gases supplemented with LPG from the nearby refineries of Cities Service and Continental Oil, by whom P.C.I. is jointly owned. Ethylene will be made in two grades — the top grade 99.8% pure — the second 98.5%. By-products will be 95% pure propylene, C_4s, and an aromatic distillate.

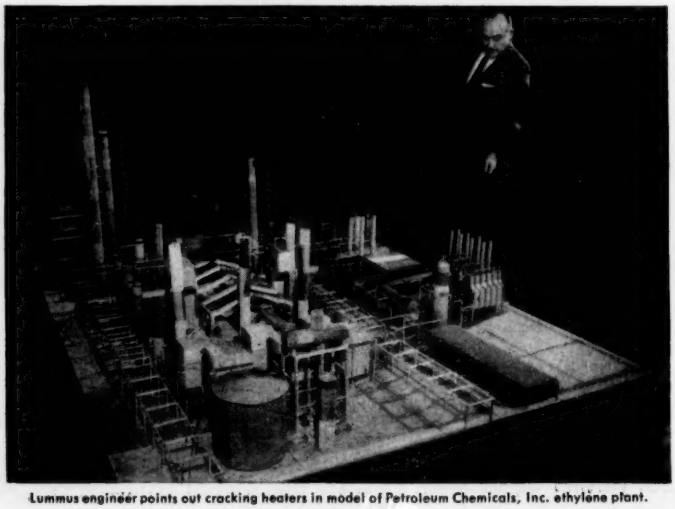
Cracking section of the plant features an improved Lummus heater which embodies years of research and development by Lummus' Heater Division. Equipment in the Lummus-designed low-temperature fractionation unit includes 12,500-hp gas turbines which drive the centrifugal charge and refrigeration compressors; exhaust from these turbines generates high-pressure steam in three waste heat boilers. The system utilizes high efficiency expanders to recover very low temperature refrigeration.

This plant brings the total of Lummus designed ethylene plants to 14, with a combined capacity of over 3 million pounds per day.

Part of the new plant's ethylene output will be sold to Calcasieu Chemical Corporation, which will use it to produce ethylene oxide and glycol in a plant adjacent to the ethylene unit. Lummus is currently designing and will build the Calcasieu installation.

Lummus has over half a century of experience with chemical and petrochemical projects. Why not discuss your next project with a Lummus representative.

THE LUMMUS COMPANY, 385 Madison Avenue, New York 17, N. Y. *Engineering and Sales Offices and Subsidiaries:* New York, Houston, Montreal, London, Paris, The Hague, Bombay. *Sales Offices:* Chicago, Caracas. *Heat Exchanger Plant:* Honesdale, Pa. *Engineering Center:* Newark, N. J.



Lummus engineer points out cracking heaters in model of Petroleum Chemicals, Inc. ethylene plant.

Business Newsletter

CHEMICAL WEEK
July 6, 1957

Hurricane Audrey's effects on Gulf Coast chemical production were being assessed this week. In spite of winds and waves that killed more than 300 persons, chemical plants came through with relatively little damage—unlike some segments of the oil industry. (*For a detailed report, see p. 25.*)

•

The chances of Mexico nationalizing its sulfur industry shouldn't be overestimated. Although the cry for nationalizing the industry is a favorite one for aspiring politicians there, Mexican government sources last week told *CW* that there have been no official discusions of such a move, nor are any such discussions contemplated.

There's no question that Mexicans are resentful of the fact that the industry was discovered and developed by "gringos." But the U. S. firms producing sulfur have taken great pains to be "good neighbors," have been reinvesting in expansion the bulk of profits they have made.

•

Imperial Chemical Industries plan a $280-million petrochemical complex in Gloucestershire, western England. The giant plant, designed to produce both organic and inorganic compounds, is slated for construction in the "mid-'70's." ICI, which has poured some $200 million into a chemical complex in North Yorkshire since the war, has a 1,000-acre site selected for its new works. The Gloucestershire installation should employ 4,000-5,000, despite extensive automation.

•

Wyoming's role as a chemical processing state will be improved if plans of Davison Chemical and Union Pacific Coal Co. (a Union Pacific Railroad subsidiary) mature. Davison is conducting an "exploratory survey" with a view to establishing a sulfuric acid plant near Casper, Wyo. Davison is said to be but one of several firms exploring the potentials of an acid plant there.

Union Pacific Coal has a synthetic fuels plant in mind. Currently, the firm's activities are confined by U. S. law to mining coal strictly for use in the railroad's locomotives; it seeks modification of the law to permit it to extract synthetic fuels and chemicals from its vast coal deposits at Rock Springs and Hanna. UP's possible investment in the plant is estimated to run as high as $50-150 million.

•

Montecatini will definitely make polypropylene at a plant to be built in West Virginia. Although the giant Italian chemical maker says it hasn't settled on a plant site, it has optioned 200 acres along the Big Sandy River near Neal. And it has told *CW* that it will be polymerizing propylene raw material purchased from Ashland Oil Co., which has a refinery along the Big Sandy in the same general area.

Business
Newsletter
(Continued)

Wyandotte Chemicals has sold its limestone quarry at Alpena, Mich., to Huron Portland Cement Co. The quarry, one of the major sources of limestone in the Midwest, has produced more than 70 million tons of stone, largely for road-building. Wyandotte says that to best utilize recent improvements in its processes, it needs to use a higher grade of chemical limestone, available from other sources. Sale price was not disclosed.

Labor, not new land, is in the news for another cement maker, Lehigh Portland Cement Co. Sixteen of the firm's plants in northeastern Pennsylvania were hit by a strike of AFL-CIO United Cement, Lime and Gypsum Workers. Several other cement manufacturers have been hit in recent weeks by strikes. And Cement Workers officials predict that more will be called this week if demands for wage increases, union shop, vacation schedules, etc., are not met at plants of most of the largest cement producers.

•

Dow Chemical and Dobeckmun Co. directors approved merger plans last week—a not-unexpected move (*CW Business Newsletter, June 22*). By the plan agreed to—which is to be voted on by Dobeckmun stockholders August 30—Dow common stock would be issued to Dobeckmun stockholders on the basis of ¾ of a Dow share for each Dobeckmun share.

•

Collier Carbon & Chemical Co. is the new company formed by the merger of Union Oil Co.'s two chemical subsidiaries, R. T. Collier Corp. and Brea Chemicals, Inc. Union had planned the merger for some time (*CW Business Newsletter, April 27*).

•

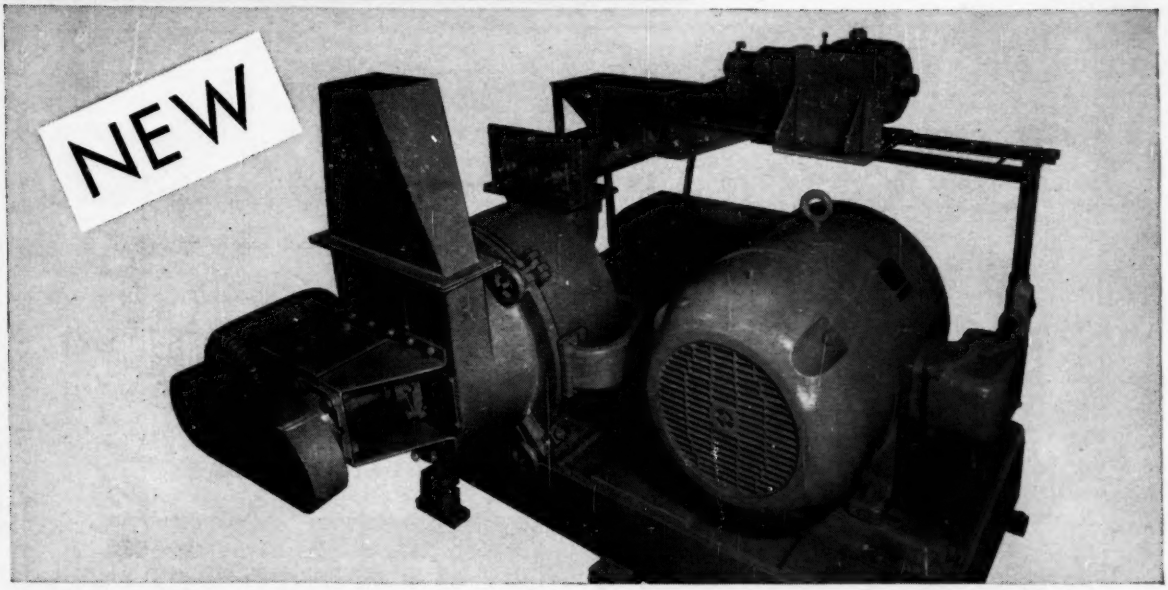
Air Products, Inc., has taken over Aldan Oxygen Mfg. Co., Philadelphia producer of oxygen, nitrogen, acetylene, hydrogen and argon. Purchase price is said to be less than $500,000.

•

Air Products has also acquired government contracts for oxygen-making equipment. One covers a $500,000 unit with 20-tons/day capacity; the other is for a 5-ton unit, costing about $100,000.

•

Corpus Christi's chemical industry is rebelling at taxes that may be levied by Texas' Nueces County. Columbia-Southern Chemical, Celanese Corp. and Great Southern Chemical Co. are among the dozen firms declaring a recent tax survey "politically inspired" and "incompetent." They say they will refuse to pay the proposed taxes. Major complaint is that the tax on their properties would be raised, while that on farm land, pipelines and smaller industries apparently would not.



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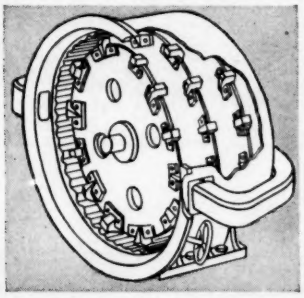
The grinding chamber contains three adjustable plates with twelve staggered beaters on each. It also features added versatility through interchangeable liners of corrugated, perforated or smooth finish, plus variable rotor stator clearances.

The Classifier unit is on a hinged section with quick-open locks for simplicity of operating adjustment or cleaning.

Material is both ground and classified through high centrifugal pressures set up by the beater and classifier plates. The Pulvocron is designed with oversize returns for automatic feed back of any oversize for further grinding.



Grinding chamber with adjustable plates, removable liners and oversize returns.

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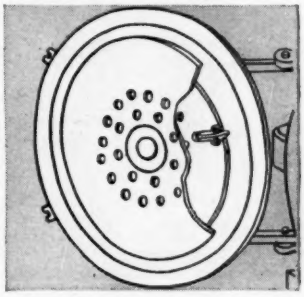
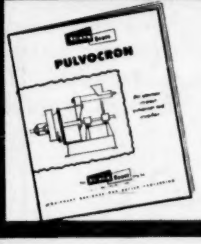


Classifier Unit with separate motor. Swings open as a hinged section with quick open locks.



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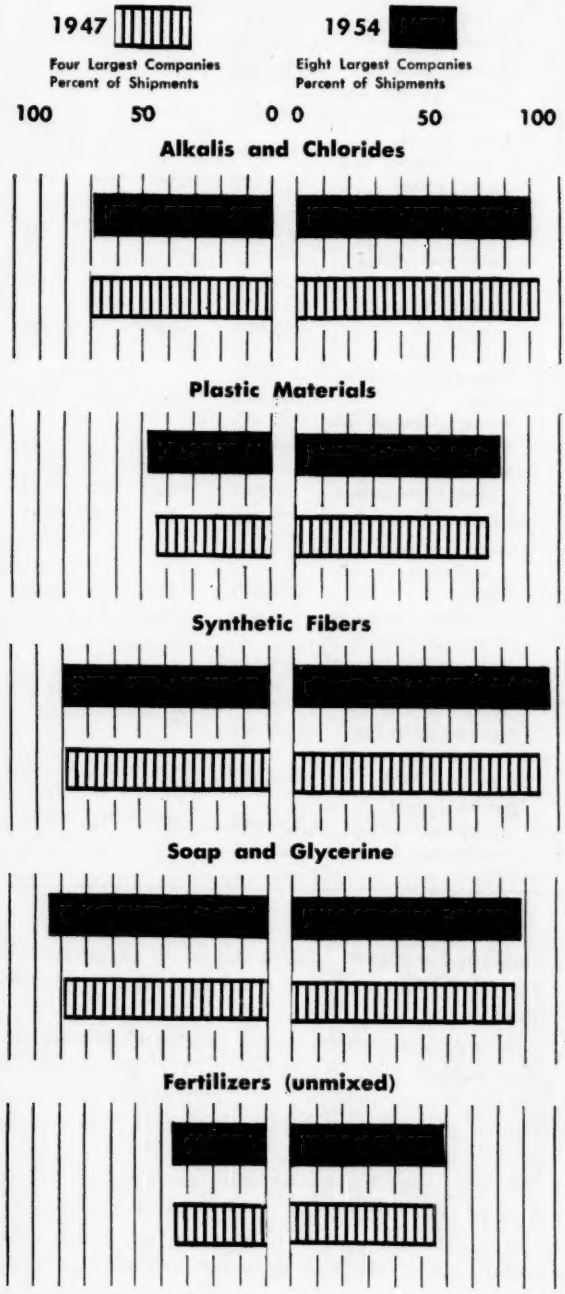
The Top Eight in Each Field:

How Their Share of the Business Changed Between 1947 and 1954



New Weapon Joins Antitrust Arsenal

THE SENATE'S much-heralded statistical report on concentration in industry is in the hands of the Senate Antitrust and Monopoly Subcommittee; 756 pages long, it details how chemical markets were shared in 1954 by the 20 largest manufacturers of the products classified.

Prepared by subcommittee staff economist Jesse Friedman (*CW, Feb. 23, p. 21*), the report assiduously avoids drawing any conclusions pertaining to antitrust. But the study—when it is finally released—will undoubtedly be hailed by subcommittee chairman Kefauver and Congressional trust-busters as a new weapon for their arsenal and the most far-reaching analysis of industrial behavior since the works of the Temporary National Economic Committee in 1941.

Not Perfect: Although this will be the word from its sponsors, caution has been urged by its compilers. Friedman himself has pointed out that the report "will not be the perfect instrument for professional analysis of industrial concentration" (*CW, June 1, p. 25*).

The subcommittee staff warns against its indiscriminate use. For some industrial classes, the data may be "extremely significant, for some it may not be significant at all," says the staff.

After citing nine "limitations and qualifications," the staff emphasizes the "importance of due professional caution in appraising and evaluating the data presented."

Long Wait: Chemical process management has been awaiting the report for some months and with mixed ideas as to what it would contain. Some expected a broad indictment of business generally, and possibly a list of prospective targets for future antitrust action.

All this may be possible, in time. But for the moment, all the report does is supply material for just about any kind of attack that critics of big business might wish to make. The tables (*see pp. 22, 23*) in the still-to-be-released report are surrounded with advice as to their use—but, these will more than likely be swept aside in the deluge of political debate that will ensue on the report's publication.

About the closest thing to a generalization that the data attempts is a brief table showing that in 1947, the 50 largest manufacturing companies accounted for 17% of value added by manufacture. By 1954, the 50 largest accounted for 23%. An additional table, re-

Dissecting Chemical Markets

Commodity	Shipments: Total value ($1000)	4 largest firms (percent)	4 next (percent)	12 next (percent)
Sulfuric acid	$161,248	*	*	1
Alkalis, chlorides	362,712	63	25	—
chlorine	87,195	54	28	17
sodium carbonate	109,120	*	*	—
sodium hydroxide	148,819	57	30	12
other alkalis	17,578	86	13	1
Inorganics (not elsewhere classified)	1,438,611	29	15	23
synthetic ammonia, nitric acid, ammonia compounds	296,868	54	29	14
chlorine, other bleach compounds	83,787	61	13	12
inorganic acids, except nitric and sulfuric	78,851	51	22	20
aluminum compounds	234,828	89	7	3
other potassium and sodium compounds	275,814	45	28	16
inorganic chemical reagents and high-purity compounds	11,738	81	13	5
other inorganic chemicals	456,725	27	17	22
Cyclic coal-tar crudes	87,426	89	6	4
Intermediates and organic colors	691,312	49	22	15
cyclic intermediates	466,631	55	26	13
cyclic dyes	156,262	64	16	14
synthetic organic pigments, lakes, toners	68,419	53	23	19
Plastic materials	1,463,460	45	16	17
cellulose	82,354	86	12	1
vulcanized fibers	12,004	93	6	1
regular cellulosic products (except rayon)	217,012	*	*	—
vinyl and polyethylene unsupported sheets	169,067	34	18	26
synthetic resins except protective coatings	765,193	49	23	19
other plastics and resins	217,141	52	14	17
Synthetic rubber	392,194	52	27	21
Synthetic fibers	1,202,343	79	16	4
acetate yarn	195,953	100	—	—
rayon (viscose and cuprammonium)	444,778	79	*	*
noncellulosic synthetic fibers (except glass)	561,612	*	*	*
Organic chemicals, nec.	2,082,231	51	13	18
industrial ethyl alcohol (natural)	26,875	92	7	1
miscellaneous cyclic chemicals	85,974	44	22	22
miscellaneous acyclic chemicals	1,569,225	64	13	15
other synthetic organic chemicals	263,221	31	18	23
pesticides and other organic materials	96,884	43	27	24
Biological products	79,909	37	15	27
Botanical products and medicinal chemicals	282,071	51	15	16
botanical products	8,610	86	11	2
drugs, of animal origin, uncompressed bulk	6,832	59	18	18
inorganic and organic medicinal chemicals, uncompressed bulk	266,035	55	13	17
Pharmaceutical preparations	1,584,692	25	18	23
antibiotics, human	252,892	67	22	9

stricted to chemical processing commodities, shows the growth (or decline) in share of markets of the four, and again the eight, largest producers of the commodities listed.

There's no way to gauge what ideas for new legislation or Congressional investigations will follow the release of the tables. Senator Kefauver, who heads the subcommittee, would like to tie the concentration study in with a price investigation. Object: to attempt to show that so-called administered prices are closely associated with concentration.

What will likely happen is that hearings will be held; summoned would be representatives of industries that show the greatest trend toward increasing concentration.

An inherent problem here is that the Census Bureau classifications were not drawn up for the purpose of making a concentration study. This results in a large number of statistical misfits—data that does not fit actual conditions.

A key point for industrialists to remember: there is small help for policy makers or legislators. The report contains no hints as to what actually causes concentration—no effort to show the relative importance

How the 20 largest producers of each commodity share the business.

Commodity	Shipments: Total value ($1000)	4 largest firms (percent)	4 next (percent)	12 next (percent)
cough and cold remedies, human	64,556	46	16	17
laxative, stomach and ulcer products	123,368	35	19	28
vitamins, human	214,507	35	25	21
other human pharmaceutical	830,742	25	17	25
pharmaceutical for veterinary	85,774	52	12	14
Soap	480,841	63	10	11
package soaps (except specialties	309,401	76	11	8
bulk soap (except specialties)	49,021	35	9	17
specialty soaps	42,949	52	18	16
glycerine	75,810	71	16	10
Cleaning and polishing preparations	997,899	52	8	10
synthetic organic detergents, packaged	504,144	95	2	2
bulk synthetic organic detergents	92,775	33	14	27
specialty detergents	91,177	33	11	15
polishing preparations and related products	225,555	37	10	15
alkaline detergents	71,372	44	13	17
Sulfonated oils and assistants	59,516	30	13	20
Paints and varnishes	1,458,297	27	10	13
paint, varnish, lacquer trade sales	735,990	25	13	13
industrial protective finishes and specialty coatings	703,789	30	13	12
Inorganic colors and pigments	370,222	65	14	13
white opaque	239,683	80	13	6
chrome	33,474	65	19	15
other inorganic pigments	96,880	*	*	*
Whiting and fillers	45,431	*	*	1
Tanning and dyeing materials	12,075	38	22	35
Fertilizers and fertilizers (mixed)	855,196	27	18	19
mixed fertilizers (complete and incomplete)	707,444	27	17	18
fertilizers, organic	12,535	24	15	26
superphosphates	131,315	50	20	18
Toilet preparations	701,532	30	12	21
perfume and water colognes	77,041	38	18	23
hair preparations	220,422	51	14	15
dentifrices, including mouthwashes and gargles	130,789	78	11	8
others	266,451	24	17	26
Glues and gelatins	180,224	23	13	21
Carbon black	102,833	69	28	3
Compressed and liquefied gases	195,390	77	6	7
elemental gases	79,716	76	7	8
acetylene	64,550	90	3	4
carbon dioxide	43,445	80	10	9
other compressed and liquefied gases	7,649	58	27	14
Insecticides and fungicides	177,956	32	17	18
Salt	71,636	83	10	6
Chemical products, nec.	596,772	15	9	15
Household insecticide and repellents	60,635	31	11	20
Weed killers	36,344	62	15	15
Chemical specialties	490,571	18	8	16

**Cannot be revealed without indicating producers.*

of such influences as mergers, internal growth, new entries, or mortalities due to a shrinking industry.

The purely factual nature of the report thus leaves interpretation entirely in the hands of subcommittee members. Even Friedman, a former Commerce Dept. economist who has worked on previous concentration studies, now has no official connection with the work.

Kefauver has introduced his own group of workers. Top man now is John Blair, a 20-year government man who started under the Democrats in a post at the Federal Trade Commission. He has done work in monopoly and pricing, was the author of the 1952 Oil Cartel Report. The latter work has been the basis of Justice Dept. activity ever since.

Staff director and co-counsel is another veteran of FTC—Paul Rand Dixon. He would conduct the questioning of witnesses in hearings. Industry, economists and others will question the data of the study along lines Friedman has suggested. Says he, "The definitions of industries and products . . . do not . . . reflect, necessarily, the relevant market in which the competition actually takes place."

Other points of question: the report makes no allowance for imports and regional market breakdowns.

Another Big One for the Charleston Complex

Blaine's Island, 1925

Five years later

As it looks today

Metamorphosis of Blaine's Island in the Kanawha epitomizes growth of Carbide's Charleston complex.

UNION CARBIDE will put a big, new petrochemicals plant into the already full-to-overflowing Charleston, W. Va., complex.

The company revealed this week that it is engineering a plant rated to produce 150 million lbs./year of ethylene oxide. The project will also add new capacity for production of ethanol, isopropanol, and other chemicals.

Location: near Poca, W. Va., a few miles down the Kanawha River from South Charleston, Charleston and Institute. UCC says it no longer has room to expand at those locations.

A substantial portion of the new plant's output, says Carbide, will supply operations at Institute and South Charleston. The remainder will be sold. No new products or processes are envisioned for the plant.

Start in a Year: Construction is expected to begin within a year. Carbide has secured about 400 acres of usable flatland. But at this point, not all land contracts have been sewed up, nor is design engineering finished. It's expected that eventually the new area will be about as big as the Institute tract.

Carbide isn't revealing the amount of investment it will put into the Poca plant, although it does say that financing will be entirely internal. Reports from the West Virginia area peg the cost at from $50 million to $80 million. At startup, the plant will employ 500.

D. B. Benedict, Union Carbide Chemicals president, says the plant is being designed "for the greatest possible flexibility . . ." Capacities, aside from that for the oxide unit, have not been announced, but the new unit should lift the company's oxide capacity—to nearly 715 million lbs./year (*CW, June 15, p. 77*).

No Tie-ups: Carbide disclaims any tie-ups of a physical nature with plants of other companies in the area, either built or to-be-built. It does say, however, that it will make connections with its own Institute and South Charleston units by tank car, barge and pipeline.

Carbide officials state that the new plant will not be directly involved with the company's coal hydrogenation or peracetic acid operations.

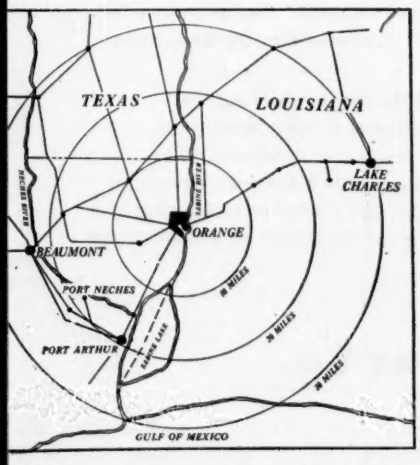
Roots in Bottomland: UCC's Carbide Chemicals division has its roots in the area around Charleston. In 1920, the company began operating one of the nation's first petrochemicals plants at a now-closed-down site near Clendenin, W. Va. Now, with bottomland at Charleston and Institute at a premium, the company is moving downstream.

In itself, the new Carbide plant will be a major addition to basic petrochemical production and an important newcomer to the already-impressive lineup of Kanawha Valley plants.

Unlike Cameron, La. (above), area's plants are in good shape . . .

In the Wake of the Big Blow

Southwest Chemical Centers got off easy last week, when hurricane Audrey roared out of the Gulf and swept northward across Louisiana. At the last minute, the 102-mile winds veered away from the giant petrochemical centers of Beaumont, Orange and Port Arthur, Tex., and Lake Charles and Baton Rouge, La., sparing them disaster.



Map shows area hit by storm. The towns are chemical centers.

How close destruction came is shown by the fate of Cameron, La., a scant 30 miles to the south of Lake Charles, and about the same distance east of Orange. Blasted first by 100-mile-an-hour winds, then smashed by a tidal wave, Cameron's oil industry was virtually destroyed. With drilling rigs blown down, oil wells ran wild, pouring sticky crude over the shambles of the once-peaceful resort town. According to late estimates, more than 300 perished in Cameron.

Personnel Problem: Damage in the chemical towns—where winds were 60-70 miles/hour—mainly affected utilities (e.g., power lines) rather than the plants themselves.

A CHEMICAL WEEK spot-check of industry in the Orange, Beaumont, Port Arthur and Lake Charles areas shows minor damage to plants, and little loss of plant production time.

• Lake Charles' petrochemical industry, for example, suffered losses estimated at little more than $50,000—largely windstorm damage to the refineries of Cities Service and Continental Oil.

• Orange and Port Arthur industry lost little, also. Although wind damage to the cities was considerable, production facilities were unhurt.

• Beaumont and Baton Rouge were hit only by winds on the edge of the hurricane, suffered little real damage.

The greatest problems for the area's petrochemical industry in the coming week will be posed by a reduced labor force. Workers will be taking time off to repair damage to property. Some industry people were casualties of the storm. For the chemical industry, the first hurricane of the new season reaffirmed the experience that a big storm can create industrial relations problems as well as production setbacks.

Schering Proxy Fight?

Cosmetic Giant Revlon, Inc., now claims 8.5% of Schering Corp. stock, a fact that has given management of the booming drug firm cause for concern. Revlon's 150,000 shares (of 1,760,000 outstanding) give it one of the largest blocks of stock held by any one company, and Wall Streeters scent a proxy fight.

Brokers Merrill Lynch, Pierce, Fenner & Beane hold what is thought to be well over 300,000 Schering shares. MLPFB originally offered the Schering stock in 1952, when the government disposed of assets seized during the war (Schering was formed in 1929 as a subsidiary of German Schering).

Schering has lately been enjoying a boom, with '56 sales of $54.3 million, and net of $10.6 million—a 19% return. In '55, its sales of $45.9 million brought in a profit of $8.27 million—an 18% return. Revlon, in '56, sold $85.7 million worth of retail cosmetics, with a net of $8.3 million.

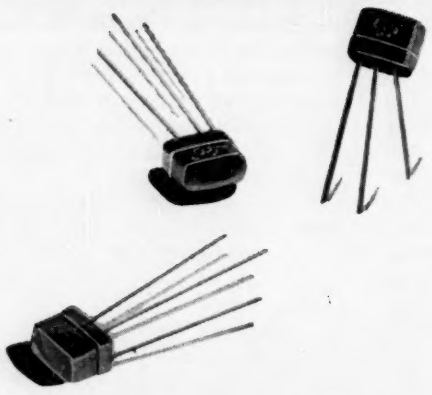
Schering's president, Francis Brown, has commented only that Revlon's purchases show a confidence in his firm's management.

Whether or not a proxy fight develops, there is some indication that Revlon and Schering—both of which have been very close-mou'hed about their financial operations—may open up a little.

Sulphur

helps to create
Headline Products

GERMANIUM



Not too long ago this relatively rare metal was a laboratory curiosity. What to do with it? Today, it's the heart of the tiny transistor—the latest giant of electronics!

What's the connection between Sulphur and Germanium?

There are two, in fact. One is man-made, involving the routine leaching of Germanium ores with Sulphuric Acid prior to tetrachloride distillation. The other takes advantage of a peculiar property of the natural mineral, Germanium Sulphide. This mineral can be volatilized and then sublimed, providing an effective method of separating the Germanium from gangue material. The process is called "Concentration of Germanium by Sulphide Sublimation".

Again Sulphur, through its major derivative, Sulphuric Acid, and a natural sulphide play an important role in our ever-expanding economy. It is difficult to find many items in the broad chemical-metallurgical field that do not somewhere along the production line make use of Sulphur or a derivative.

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Sulphur Producing Units
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- Worland, Wyoming

Washington
Newsletter

CHEMICAL WEEK
July 6, 1957

The changing role of business executives in government—the so-called WOCs—now is in sharper focus. New policy rules by Commerce Secy. Sinclair Weeks make official a plan (*CW Washington Newsletter, June 15, June 29*) to bar WOC appointments to policy-making directorships in the department's Business & Defense Services Administration's setup.

Businessmen will not run the BDSA divisions. They will continue to receive six-month nonsalaried appointments to BDSA's 25 industry divisions, but will serve under government career officers who will head the divisions. WOCs will be eligible for assistant division directorships, branch-chief assignments and consultant status.

Weeks created one new class for WOC jobs—as administrative advisor to division director. The job description hasn't been defined yet, but officials say most such appointees will serve on a part-time basis as consultants to government career-division heads. Others may work full-time handling special jobs in the defense mobilization field—an area where the law allows WOCs to participate more directly in policy making.

The new Chemical & Rubber division director will serve full time. Du Pont sales executive Carl R. Faust escapes the impact of the new rules. Faust accepted the job as division head before the new rules went into effect on July 1. He took the oath of office June 28, succeeding Hal Johnson.

Faust will be the last industry man to head the C & R division. When his tenure ends Dec. 31, a government career man will take charge on a permanent basis.

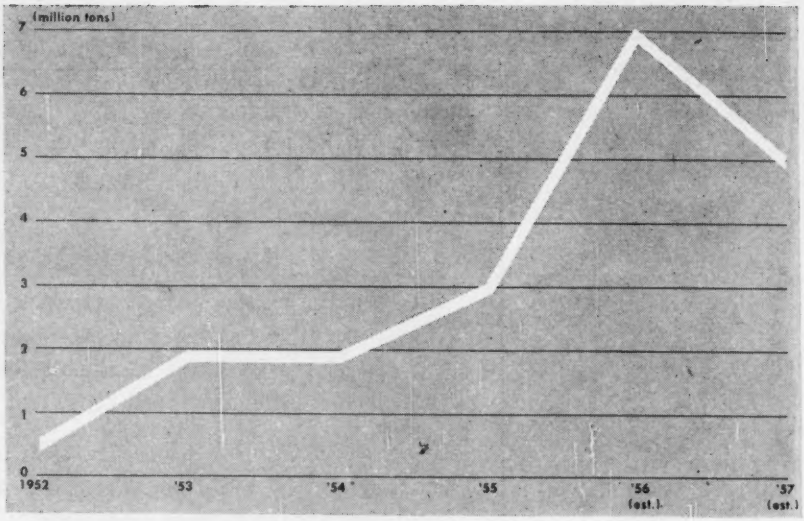
Chemical industry management faces a hard decision as a result of the new setup: Is it worth the sacrifice to send an executive to Washington to fill a job lacking in authority or prestige? Despite the fancy title, an administrative advisor in BDSA has no assurance that his advice won't be resented—much less accepted.

The issue will be faced in October, when Weeks will call on the industry to propose an administrative advisor from industry ranks to succeed Faust on Jan. 1. The trade's reported current view is that industry men should not serve under the new setup—at least in peacetime.

The new rules weren't Weeks' idea. He was forced to make the change by Congress—as the price for backing down on its refusal to provide any funds to operate the industry divisions after July 1. Weeks' concession is one of several in a dispute with Congress over the role of businessmen in government—a fight now ended in just about complete victory for congressmen.

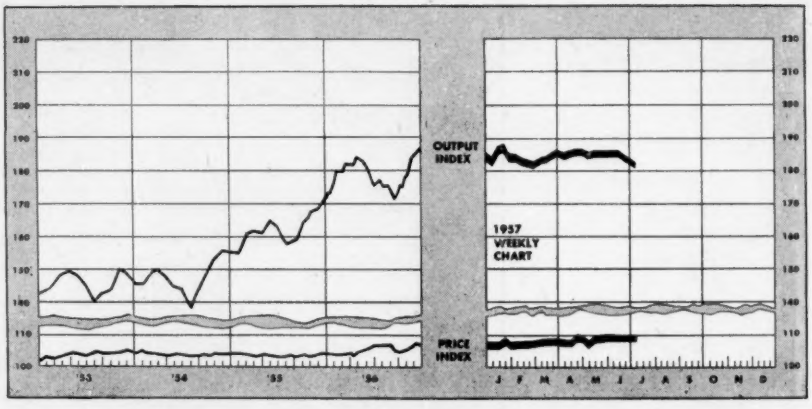
Charting Business

CHEMICAL WEEK
July 6, 1957



Japan's Polystyrene Imports Slip Off

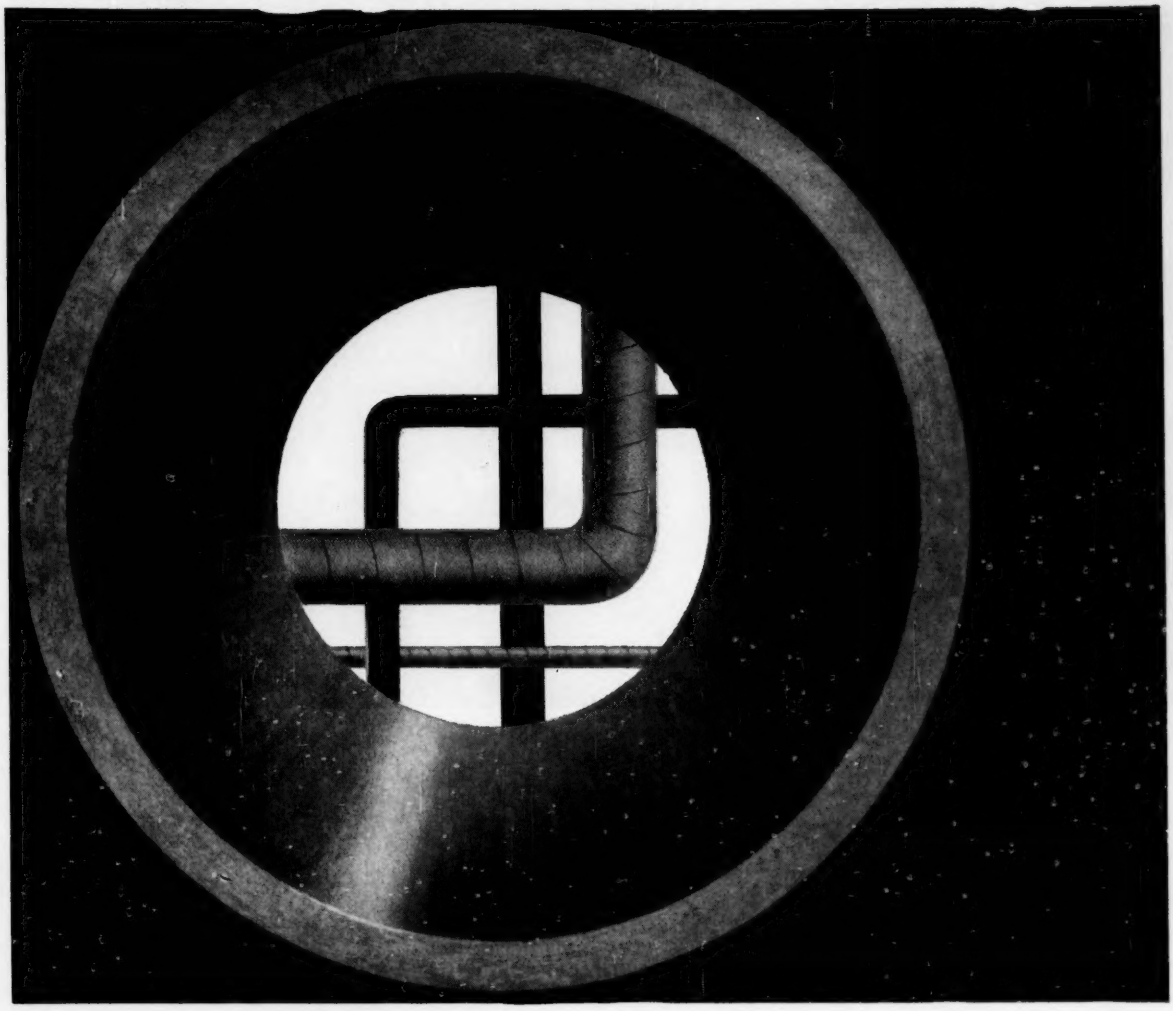
AS Japanese polystyrene production catches up with domestic demand, imports *(see graph)* this year are expected to level off at 5 million tons; in '56, imports totaled 7 million tons. Contributing to this growth are newly installed polymerization plants. Early this year, Asahi-Dow came onsteam with a 250-tons/month unit, while another 250-tons/month plant was commissioned by Monsanto Kasei. These units are expected, by '60, to purchase all the monomers from domestic sources rather than from U. S. suppliers.



Business Indicators

WEEKLY	Latest Week	Preceding Week	Year Ago
Chemical Week output index (1947-49=100)	181.6	182.5	175.9
Chemical Week wholesale price index (1947=100)	110.1	110.1	105.4
Stock price index of 11 chemical companies (Standard & Poor's Corp.)	45.12	45.82	48.97

MONTHLY Wholesale Prices (Index 1947-1949=100)	Latest Month	Preceding Month	Year Ago
All commodities (other than farm and foods)	125.3	125.4	121.7
Chemicals and allied products	109.1	109.1	106.9
Industrial chemicals	123.6	123.6	120.8



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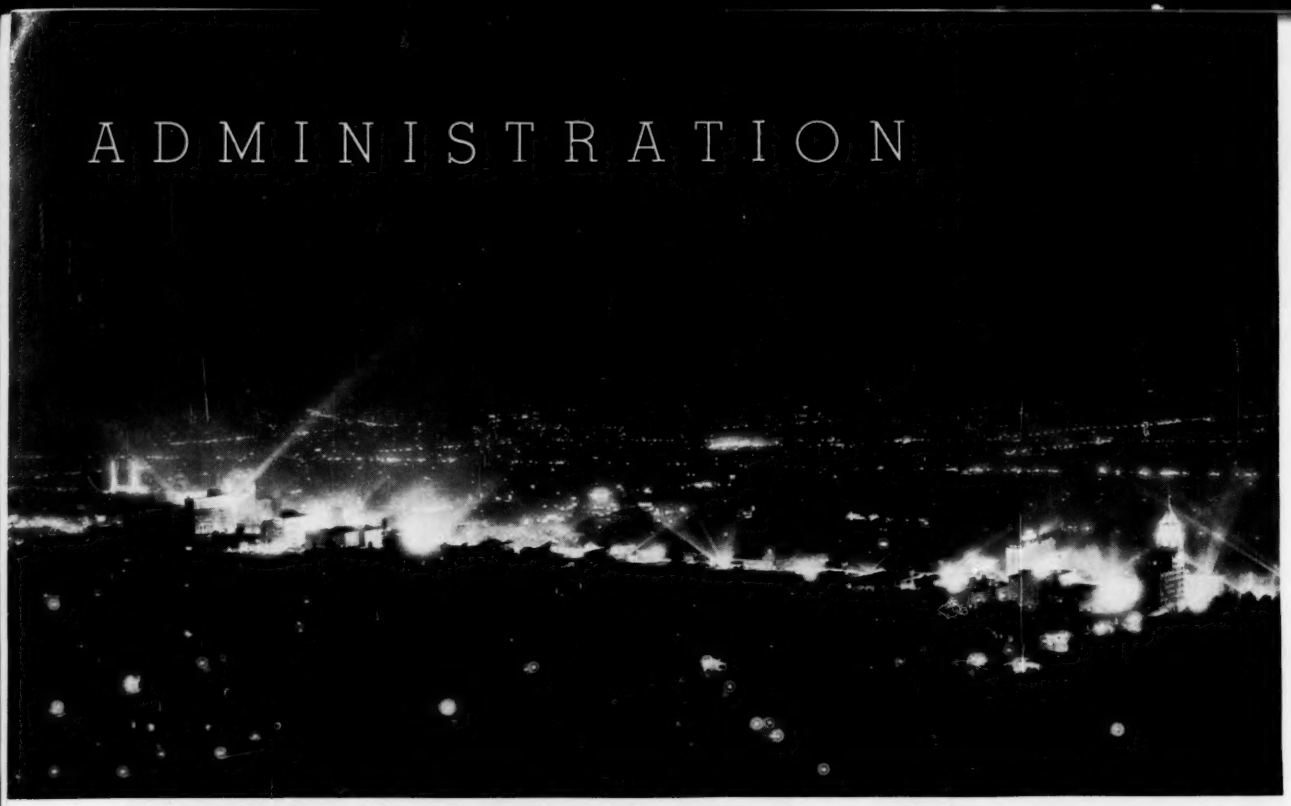


Despite problems, chemical firms in crowded central Los Angeles area won't budge.

Smog or Not—They Like It in Los Angeles

POPULATION rising rapidly, industrialization keeping step, and air pollution control rules getting tougher—these are the broad outlines of what's happening in Los Angeles, third-ranking metropolitan and manufacturing center in the U. S. In at least one important detail—industrial growth—the picture is different in the sprawling community's "central area," an approximately 12x14-mile rectangle (*map, p. 32; key list, p. 33*) that includes:

- Los Angeles' downtown business district.
- Hollywood and other residential and studio neighborhoods.
- Vernon, Maywood, South Gate and other relatively industrial localities in or near the rambling city.

While the harbor area (*CW, Oct. 9, '54, p. 18*)—with its petroleum refineries, open spaces and ocean shipping terminal—has bright prospects for further process industry development, the central area is thickly populated, has no major feedstock sources of its own, and its plant sites are about 10-25 miles from the nearest piers.

No Exodus Ahead: Although expansion possibilities are more limited in the central area, its present process plants don't seem to be suffering. In general, chemical companies in central Los Angeles are thriving and want to stay put.

This includes the downtown headquarters operations of two major chemical producers—American Potash & Chemical Corp. and U. S. Borax & Chemical Corp.'s Pacific Coast Borax Co. Division—and three oil companies—Richfield Oil, General Petroleum and Union Oil. Of the three oil concerns, however, only General Petroleum produces within the central area.

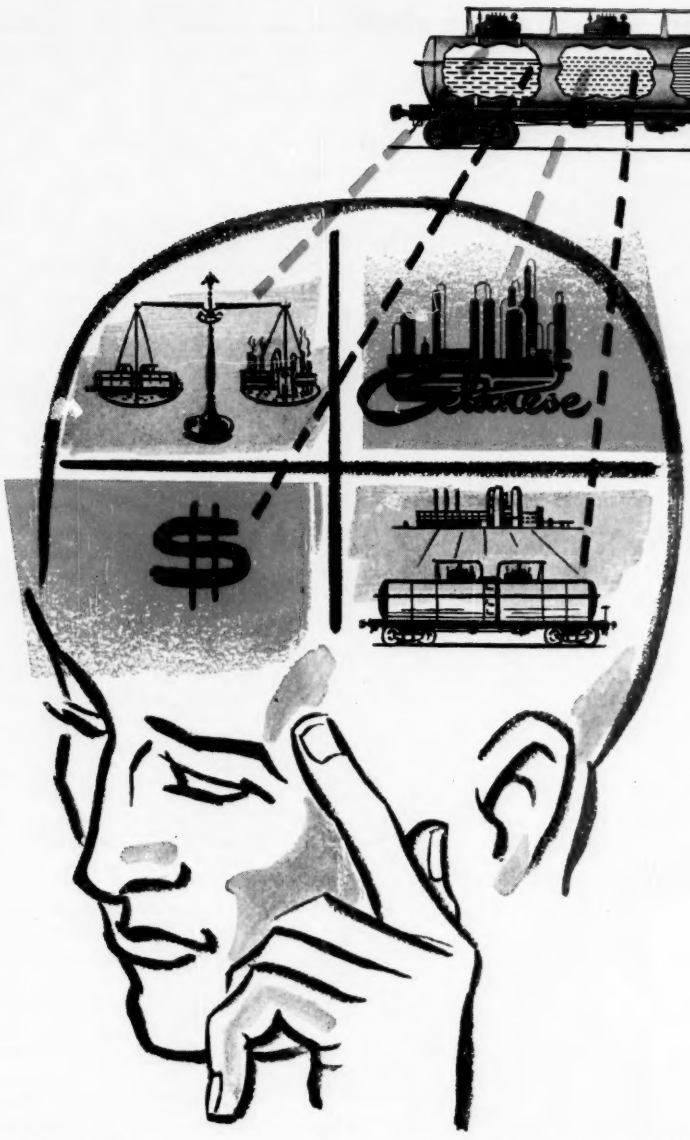
One of the area's original clusters of chemical plants is in Vernon, which fairly bristles with industry.

Here, within a few blocks of each other, are Filtrol Corp., AmPot's Los Angeles plant, Stauffer Chemical's sulfuric acid plant, Pacific Vegetable Oil Corp. and what's left of General Petroleum's original refining operations.

Filtrol has become probably the world's largest maker of absorbents and gel-type alumina, the country's largest manufacturer of desiccants, and the largest southern California producer of ammonium sulfate.

Stauffer built its Vernon plant in 1918. To fill local needs for sulfuric acid, it shipped in mined sulfur, but now relies on sulfur-recovery units of local petroleum refiners. Stauffer, too, apparently is in Vernon to stay. Its product line has multiplied (*see plant-and-product list, p. 33*); another acid unit was added several years ago; and a new fertilizer-pelletizing plant was installed in '56.

Boron Products Added: AmPot's next-door plant—obtained five years ago when AmPot acquired Eston Chemicals Co.—was located there for convenience in getting sulfuric acid and sulfur dioxide from Stauffer. Since coming into the AmPot organization, the plant's line of agricultural, industrial and refrigeration chem-



CHECK LIST FOR CELANESE SOLVENTS AND PLASTICIZERS:

SOLVENTS

ALCOHOLS
Methanol
Normal Propyl Alcohol
Isobutyl Alcohol
Normal Butyl Alcohol
3-Methoxy Butanol

ESTERS
Normal Propyl Acetate
Normal Butyl Acetate
Ethylene Glycol Diacetate

GLYCOLS
Propylene Glycol
Dipropylene Glycol
1, 3-Butylene Glycol
2, 3-Butylene Glycol

KETONES
Acetone
Methyl Ethyl Ketone

LOW-COST REPLACEMENT SOLVENTS
for butyl alcohol and methyl ethyl ketone

PLASTICIZERS

PHOSPHATES
Tricresyl Phosphate
Tris Beta Chlorethyl Phosphate
Cresyl Diphenyl Phosphate

PHTHALATES
Dioctyl Phthalate
Dibutyl Phthalate

solution to your inventory problems:

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If you buy solvents or plasticizers in bulk quantities, consider this: *why overload inventory for the sake of a price benefit, or pay LCL prices, when you can combine your shipments of plasticizers and solvents in Celanese compartmented tank cars and tank wagons and gain the full advantage of bulk prices?*

One Celanese compartmented shipment can include a number of different plasticizers and solvents, permitting you to balance inventory and production needs.

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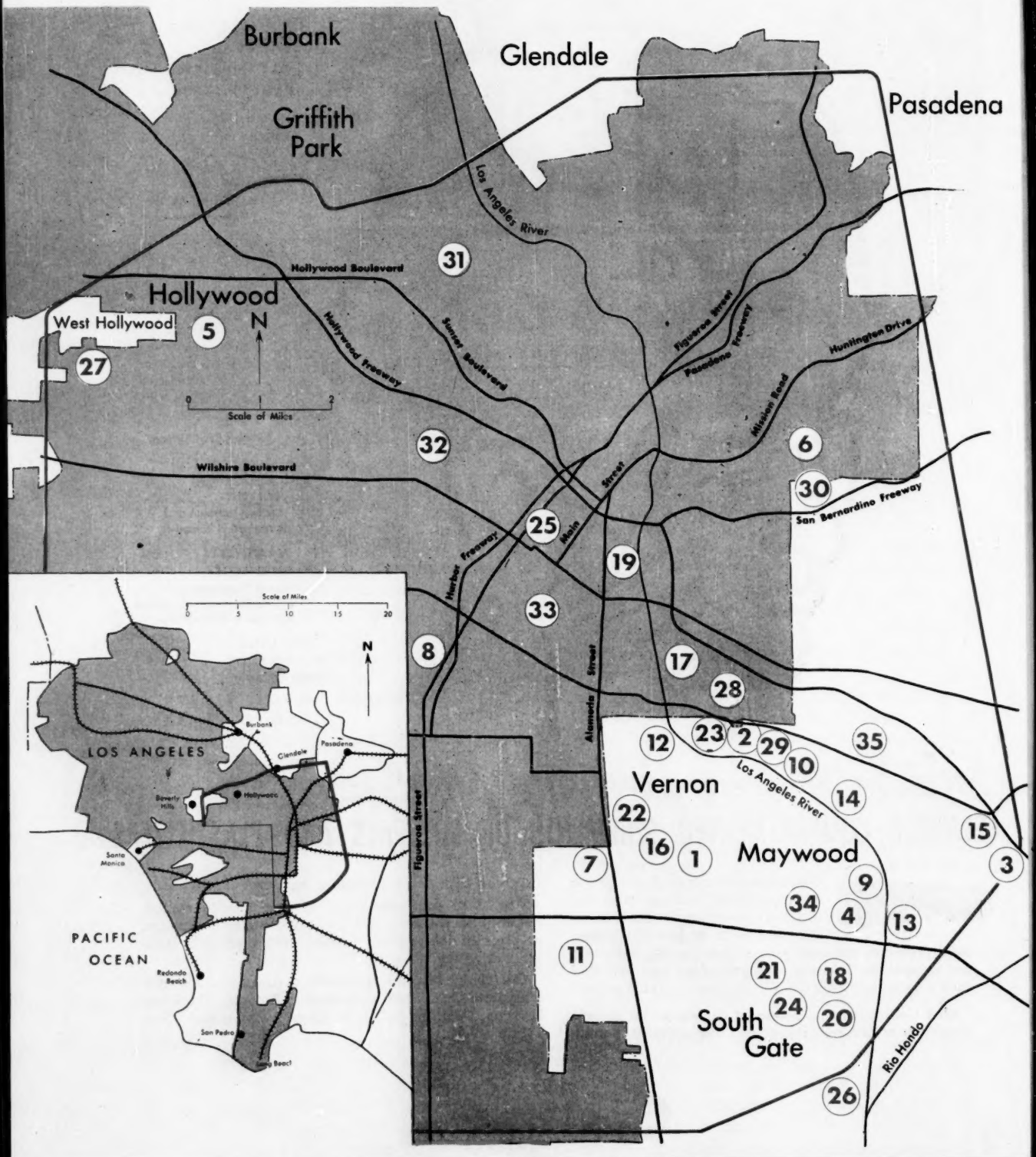
Burbank
Glendale
Pasadena
Griffith Park
Los Angeles River
Hollywood Boulevard
Hollywood
West Hollywood
N
Scale of Miles
0 1 2
Hollywood Freeway
Sunset Boulevard
Figueroa Street
Pasadena Freeway
Huntington Drive
Mission Road
Wilshire Boulevard
Harbor Freeway
Main Street
San Bernardino Freeway
Alameda Street
Figueroa Street
Vernon
Los Angeles River
Maywood
South Gate
Rio Hondo
31
5
27
32
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26
Scale of Miles
0 5 10 15 20
N
LOS ANGELES
Burbank
Glendale
Pasadena
Beverly Hills
Hollywood
Santa Monica
PACIFIC OCEAN
Redondo Beach
San Pedro
Long Beach

1 **Air Reduction Pacific Co.**, industrial gases
2 **American Potash & Chemical Corp.**, boron, boron compounds, and industrial, agricultural, and refrigeration chemicals
3 **Archer-Daniels-Midland Co.**, alkyd resins, maleic-modified vegetable oils, pentaerythritol-modified vegetable oils
4 **Baker Castor Oil Co.**, castor oil esters and fatty acids
5 **Bireley's Division, General Foods**, pectin, citric acid
6 **Bray Chemical Co.**, petroleum sulfonates
7 **Burdett Oxygen Co. of California**, industrial gases
8 **California Foundation for Biochemical Research**, isotope-labeled compounds, amino acids, carbohydrates, fatty acids, plant hormones, ribose nuclear acid derivatives, vitamins, coenzymes
9 **Chlorine Solutions, Inc.**, sodium hypochlorite
10 **Filtrol Corp.**, gel-type alumina, aluminum sulfate, cracking catalysts
11 **General Carbon Co.**, lampblack
12 **General Petroleum Corp., subsidiary of Socony Mobil Oil Co.**, copper naphthenate, naphthenic acids
13 **Home Needs Co., division of Salem Commodities**, sodium hypochlorite
14 **Morris P. Kirk & Son, Inc., subsidiary of National Lead Co.**, litharge, red lead, zinc chloride solution
15 **Lever Brothers Co.**, glycerine
16 **Linde Co., division of Union Carbide Corp.**, acetylene, nitrogen, oxygen, hydrogen, calcium carbide
17 **Liquid Carbonic Corp.**, carbon dioxide
18 **Los Angeles Chemical Co.**, arsenic compounds, graphite, ceramic colors, copper oleate
19 **Los Angeles Soap Co.**, glycerine, tallow
20 **A. R. Maas Chemical Co., division of Victor Chemical Works**, phosphorous compounds, sodium carbonate, sodium thiosulfate, sodium sulfite, ethylenediamine tetra-acetic acid
21 **National Aluminate Corp.**, cracking catalysts
22 **National Cylinder Gas Co.**, industrial gases
23 **Pacific Vegetable Oil Corp.**, maleic-modified fish and vegetable oils
24 **Philadelphia Quartz Co. of California**, sodium silicate, anhydrous sodium metasilicate, and sodium metasilicate pentahydrate
25 **Productol Co.**, *o*-cresol, *m*- and *p*-cresol mixture, cresylic acids, naphthalene, phenol, xylenols
26 **Purex Corp., Ltd.**, sodium dodecyl benzene sulfonate, sodium hypochlorite
27 **Riker Laboratories, Inc.**, alkavervir, alseroxylon, alkylol amides, dialkylol amides, glycol esters, lauryl sulfate, monoglycerides, polyglycol esters, rescinamine, sequestering agents
28 **Sherwin-Williams Co. of California**, alkyd resins
29 **Stauffer Chemical Co.**, processed sulfur, sulfuric acid, single superphosphates
30 **Sterol Derivatives, Inc.**, acetylated monoglycerides, brominated apricot kernel oil, brominated vegetable oils, estrogenic substances, mercurin, organic and biochemical research compounds
31 **Thompson Chemicals Corp.**, amine salts, α-naphthalene acetamide, methyl esters of α-naphthalene acetic acid, isooctyl esters, hydrated calcium oxide
32 **United States Lime Products Corp.**, calcium oxides
33 **Vitamin Technologists, Inc.**, vitamins D_2 and D_3
34 **Vopcolene Division, Vegetable Oil Products Co., Inc.**, fatty acids, glycerine, oleic acid.
35 **Western Lead Products Co.**, litharge, red lead

icals has been augmented by the addition of several upgraded boron compounds.

General Petroleum formerly had extensive facilities in Vernon, but in '29 and subsequent years most refinery operations have been transferred to Torrance. The Vernon plant still turns out some 3.5 million lbs./year of naphthenic acids, 500,000 lbs./year of copper naphthenate.

Another firm that says it intends to remain in Vernon is Pacific Vegetable Oil Corp. Principal products here include processed linseed oil, castor bean oil, safflower oil.

For Pretalkie Films: Another cluster of chemical plants is in South Gate, a separate municipality. Neighbors are Los Angeles Chemical Co., National Aluminate Corp., A. R. Maas Chemical Co. and Philadelphia Quartz Co. Here, too, is Purex Corp., Ltd.

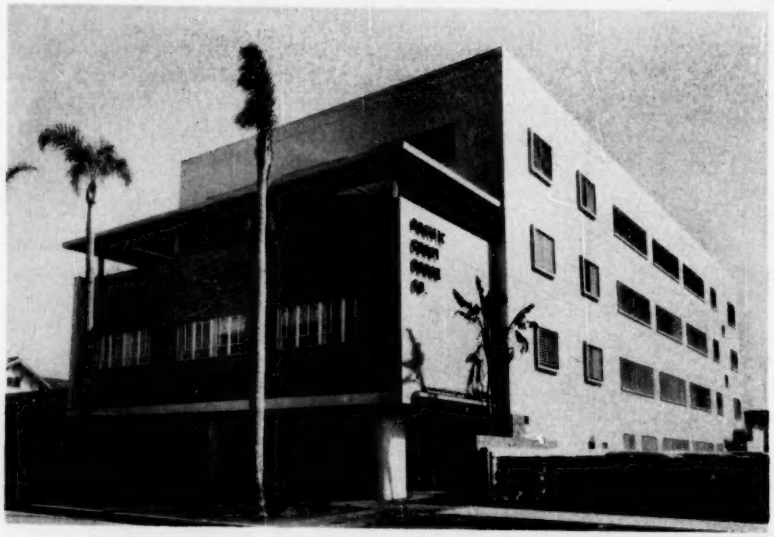
Maas—formed during World War I to meet the movie industry's urgent need for photographic chemicals previously supplied by German producers—has become the largest Western producer of sodium phosphates and phosphoric acid, as well as photographic chemicals. Going onstream last month was a new $250,000 unit for making ethylenediamine tetra-acetic acid and related chelating agents—for Maas, a new departure.

Los Angeles Chemical started out in 1914 as a jobber, now has largely converted to manufacturing. Using Western raw materials, it has gone into production of some prime chemicals (arsenicals, copper oxychloride, ground sulfur), insecticides, specialties for the petroleum industry (drilling compounds and water treatment chemicals), and ceramic colors (principally metallic oxides). It remains a jobber of industrial chemicals and laboratory supplies.

Liquid bleach is still the principal product of 32-year-old Purex, but the company now has a broad line of cleaning products, both household and industrial. Up to 1947, Purex had distribution only in the West, now markets nationally and internationally. Its South Gate plant's two basic chemicals—sodium dodecyl benzene sulfonate and sodium hypochlorite—are marketed within a roughly 400-mile radius.

Four 'Native Sons': Four other central area chemical concerns: U. B. Bray Co. was formed in 1939, primarily to develop and produce corrosion-preventive compounds and lubricating oil additives for the petroleum industry. That firm later was split into the two associated organizations operating now: Bray Chemical, a major supplier of petroleum sulfonates and sodium sulfonates; and Bray Oil, well established in rust preventives.

Also principally serving the petroleum industry is Tretolite Co. of California, a division of Petrolite Corp. (St. Louis). Formed in 1924, Tretolite markets a line of demulsifiers, corrosion inhibitors, scale preventives, paraffin removers, bactericides, foam preventives and



OFF WILSHIRE BLVD., Pacific Coast Borax headquarters.

ON LOS ANGELES RIVER, AmPot plant (center, foreground).

asphalt additives for bituminous paving. It has doubled its central area facilities during the past year.

Productol Co.—a division of Ehrhart & Associates, design engineers—is a prime chemical producer located in Los Angeles to be near a source of petroleum. Products: *o*-cresol, *m*- and *p*-cresol mixture, cresylic acids, naphthalene, phenol and xylenols.

There's also Vopcolene, which makes fatty acids. Among its customers are the rubber industry, manufacurers of alkyd resin oils and paints and the petroleum industry. Two other companies with similar products are Baker Castor Oil and Pacific Vegetable Oil, serving mainly the paint and varnish industries.

Big Industrial Customers: Most of Los Angeles' chemical industry was established to meet local needs. Largest single customer—and also a major supplier of raw materials—is the region's petroleum-producing and refining industry. Other local chemical-consuming industries:

Soap—Principal plants are those of Lever Bros., Procter & Gamble, Los Angeles Soap Co. (White King) and Purex, but there are also many smaller manufacturers.

Paint—Los Angeles Paint, Varnish & Lacquer Assn. has some 60 manufacturing concerns on its roster, all with plants in the vicinity and mostly in the central area.

Aircraft—Specialized needs in plastics, paints and other finishes, cleaners, lubricants, and other items are filled by local chemical firms (*CW, June 26, '54, p. 82*), such as Jackson Chemical Co., Kelite Corp., and Turco Products, Inc.

Agriculture—A major agricultural area, southern California needs fertilizers and pesticides.

Rubber — Firestone, Goodrich, Goodyear, U.S. Rubber and numerous smaller companies have plants in the area.

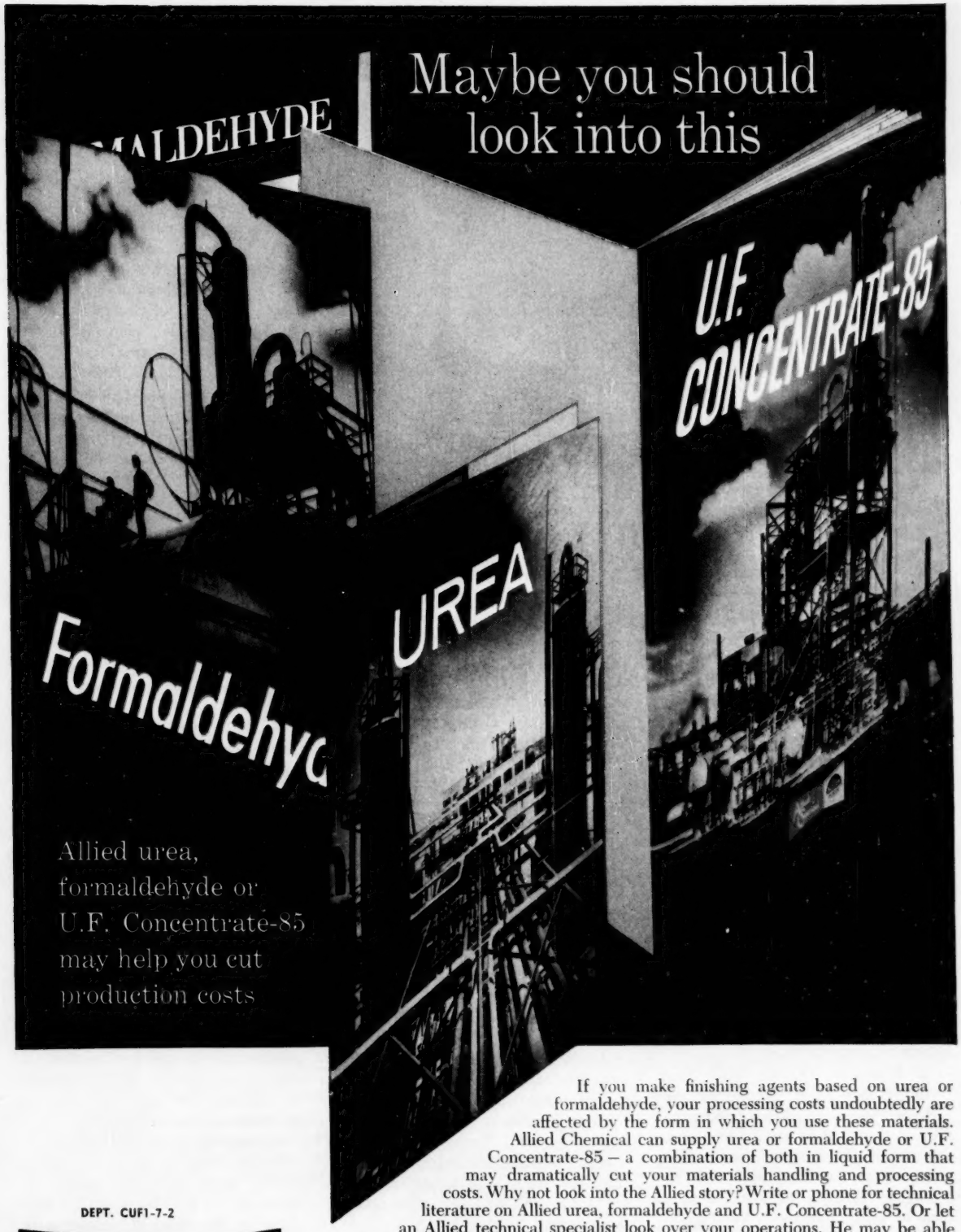
Water, Sewage, Land: Thus it's clear that most of this central area's chemical industry is occupied with secondary processing, and primarily for local markets. Factors tending to keep new companies out of this area:

- Skimpy water supply.
- Poor sewage and drainage systems.
- High land values, crowded quarters.
- Stiffening pollution control laws. Starting this month, for instance, companies will have to pay more for permits to build or alter installations "capable of emitting objectionable effluents into the atmosphere." Fees, which now range up to $500/unit of production, are collected by Los Angeles County's Air Pollution Control District. And, under consideration are new regulations on the use of solvents in manufacturing and service industries.

Nevertheless, Los Angeles, biggest and fastest-growing community in the big and fast-growing West, should gain much in the way of chemical process plants over the next few years. Most chemical growth in the immediate future is likely to be in resins and plastics.

Most basic chemicals will continue to be shipped in for some time—not only because petroleum is the only major raw material locally available but also because the Western market is still too small to support major facilities.

But as the southern California industrial market grows, production of basic chemicals will become an increasingly important element of the city's chemical process picture.



If you make finishing agents based on urea or formaldehyde, your processing costs undoubtedly are affected by the form in which you use these materials. Allied Chemical can supply urea or formaldehyde or U.F. Concentrate-85 – a combination of both in liquid form that may dramatically cut your materials handling and processing costs. Why not look into the Allied story? Write or phone for technical literature on Allied urea, formaldehyde and U.F. Concentrate-85. Or let an Allied technical specialist look over your operations. He may be able to suggest simple modifications that will reduce your resin-making costs.

DEPT. CUF1-7-2

Allied Chemical — NITROGEN DIVISION

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LABOR

Pension Fund Clash: The battle over federal supervision of employee benefit plans has formally opened, with a Senate subcommittee headed by Sen. John Kennedy (D., Mass.) holding a hearing in Washington. First employer witness: Robert Tyson, U.S. Steel Corp.'s finance committee chairman, who argued that most benefit plans are operating so smoothly no supervision by the government is needed. He said the federal government should let state governments take the initiative in this field; but in the event that Congress insists on a federal policing program, Tyson recommends:

- The law should deal with reporting and disclosure, not regulation.
- Employer-administered "level of benefit" plans should be exempted.
- Reports should go to the Securities & Exchange Commission rather than to the Dept. of Labor.

In contrast, AFL-CIO wants federal registration of all benefit plans, and holds that the Labor Dept. should handle the job. Essentially the same position is taken by Secretary of Labor James Mitchell.

•

Decisions Affecting Organizing: Labor unions broke even in two recent federal court decisions relating to organizing tactics. In a Wisconsin case, the U.S. Supreme Court upheld a state court's injunction that—in accordance with a state law—banned picketing on the part of a Teamster local that was trying to organize employees of Vogt, Inc. The high court's majority opinion—written by Justice Felix Frankfurter—recognizes that a state has "wide discretion" in formulating policy on picketing, so long as there is no attempt to abridge free speech.

In Kentucky, District Judge Mac Swinford has ruled unconstitutional a Russellville city ordinance requiring a union organizer to pay a $25 license fee before he can operate in that town. Judge Swinford says such an ordinance infringes the workers' freedom to select bargaining representatives of their own choice, as guaranteed by the Taft-Hartley law.

•

Rubber Wage Parleys: Now that the petroleum industry has pretty well worked out its current wage settlements, with increases mostly around 6%, the next major pay parleys will be in the rubber industry. Starting dates for negotiations with United Rubber Workers bargaining committees: Goodyear, July 2, Cleveland; Goodrich, July 9, Columbus; U.S. Rubber, July 9, Cincinnati; and Firestone, July 10, Canton, O. Steel and auto negotiations come up in 1958.

WIDE WORLD

U.S. STEEL'S TYSON: He holds policing of funds isn't needed.

•

Study on Incentives: How an "average company" needs and can establish more and better incentives—especially for indirect production workers and supervisors—is the theme of "Better Wage Incentives," a new book by Phil Carroll, industrial management consultant. Particular attention is given to planning to prevent various types of incentive grievances.

LEGAL

Another Trade Secrets Case: In a suit that bears some resemblance to the Monsanto Chemical vs. Central Farmers Fertilizer Co. case (*CW, May 25, p. 41*), Young Radiator Co. (Racine, Wis.) has charged a former employee, Hiram J. Kinkade, and Perfex Corp. (Milwaukee) with unfair competition.

Young Radiator alleges that Kinkade and Perfex Corp. used confidential design data, engineering drawings, price lists and other restricted Young records to set up and market a competing line of products. The dispute centers about air-cooled-type coolers and condensers for the oil and chemical industries, which have been marketed by Young since 1937.

The case is pending in Milwaukee County circuit court.

In the Monsanto suit—stemming from charges that Central is to use Monsanto process secrets in building a $7.5-million plant—the firms recently agreed that a Monsanto representative may inspect the design, engineering and process of Central's abuilding Georgetown, Ida., plant (*CW Business Newsletter, June 22*).

•

Sodium Fluoride Label: Effective this week, sodium fluoride dentifrices must bear on the label—"in juxtaposition with directions for use"—a clear warning against use of the product by children under six years of age.

The change in labeling of sodium fluoride dentifrices has been ordered by U.S. Food & Drugs Commissioner George Larrick following publication of the proposal in the *Federal Register*.

Earlier—following the decision to exempt the products from prescription-dispensing requirements of Section 503 (b) (1) (c) of the Federal Food, Drug and Cosmetic Act—it was decided the label should carry a warning against use of the preparations in areas where the water supply contains fluoride, except as directed by a dentist. A later determination substituted the warning against use by children under six years of age.

IDEAS

Industry Cooperation: Detailed technical information of the cause of the April 16 explosion at Monsanto Chemical Co.'s Nitro, W. Va., plant (*CW, May 11, p. 46*) has been supplied to other producers of methyl parathion, according to Howard Minckler, director of manufacturing for Monsanto's Organic Chemicals Division, which operates the plant.

Also included in the report—an especially novel display of industry cooperation — is information on steps taken by Monsanto to prevent a recurrence of the tragedy that took eight lives and destroyed the methyl parathion unit. The report was based on an investigation that revealed instrument failure as the cause of the explosion. The mishap occurred in a reac-

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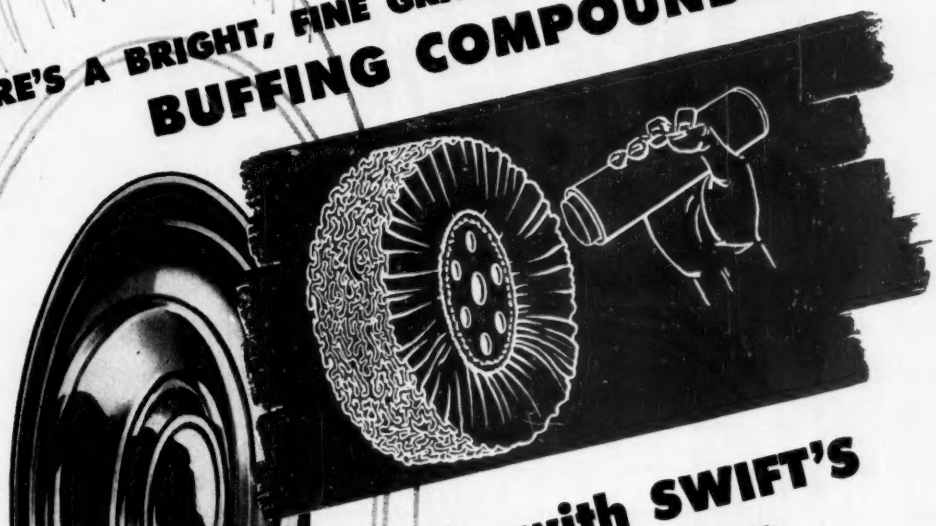

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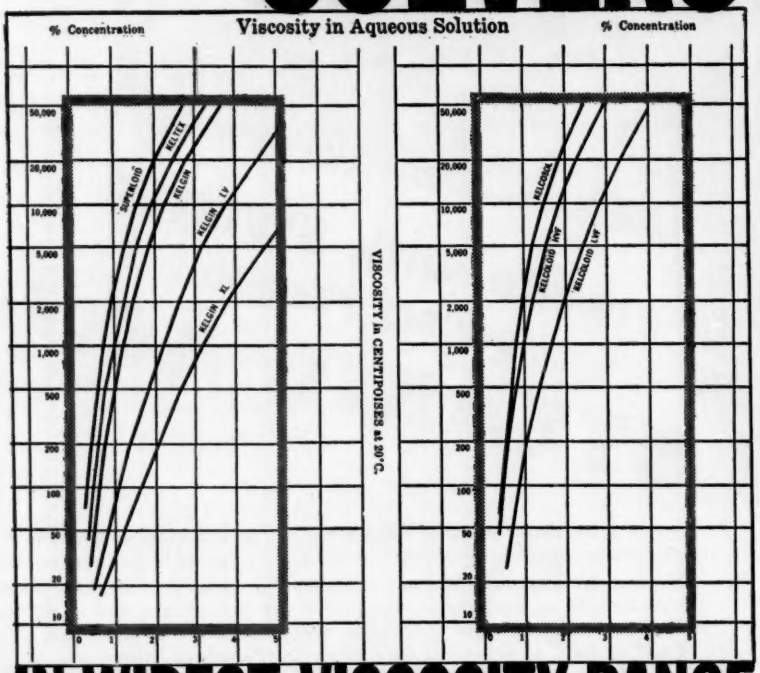

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ADMINISTRATION

tor vessel during a chlorination step.

•

Preventing Defense 'Leaks': Chemical process managers with classified contracts will want the government's just-released report on preventing government and industrial "leaks" that would benefit an enemy.

The 800-page ($2.50) document—compiled by the Commission on Government Security — may be obtained by writing: Supt. of Documents, Government Printing Office, Washington 25, D.C.

KEY CHANGES

James A. McConnell, to director, Commercial Solvents Corp. (New York).

Michael G. Kaufman, to vice-president and treasurer, Eastern Metal Converters (New York), selenium products manufacturers.

J. W. Keener, to president, director, and member of the executive committee, and **Reuben B. Robertson, Jr.,** to director, B. F. Goodrich Co.

R. E. Lenhard, to executive vice-president, Air Reduction Sales Co.; and **W. A. Lunger,** to president, Ohio Chemical & Surgical Equipment Co. division; Air Reduction Co. (New York).

John C. Sprague, to vice-president in charge of administration and finance, Acheson Industries (New York).

W. P. Morris, to president, Duval Sulphur & Potash Co. (Houston, Tex.).

Preston W. Parvis, to director, and **D. J. Carroll Copps** and **Edward J. Goett,** to senior vice-president, Atlas Powder Co.

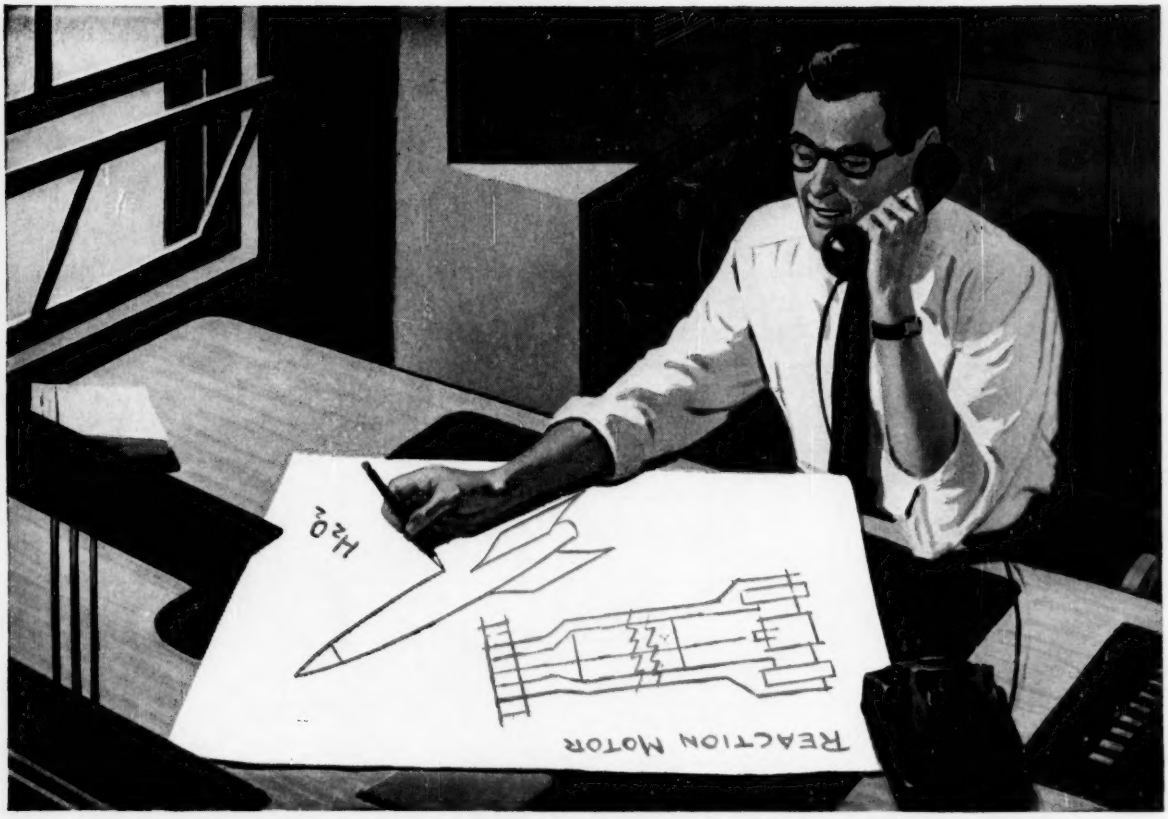
RETIRED

James P. Margeson, director and executive vice-president, International Minerals & Chemical Corp.

John L. Collyer, board chairman and chief executive officer, B. F. Goodrich Co.

DIED

Frederick P. Siebel, 83, board chairman, J. E. Siebel Sons, Co. (Chicago), at Chicago.



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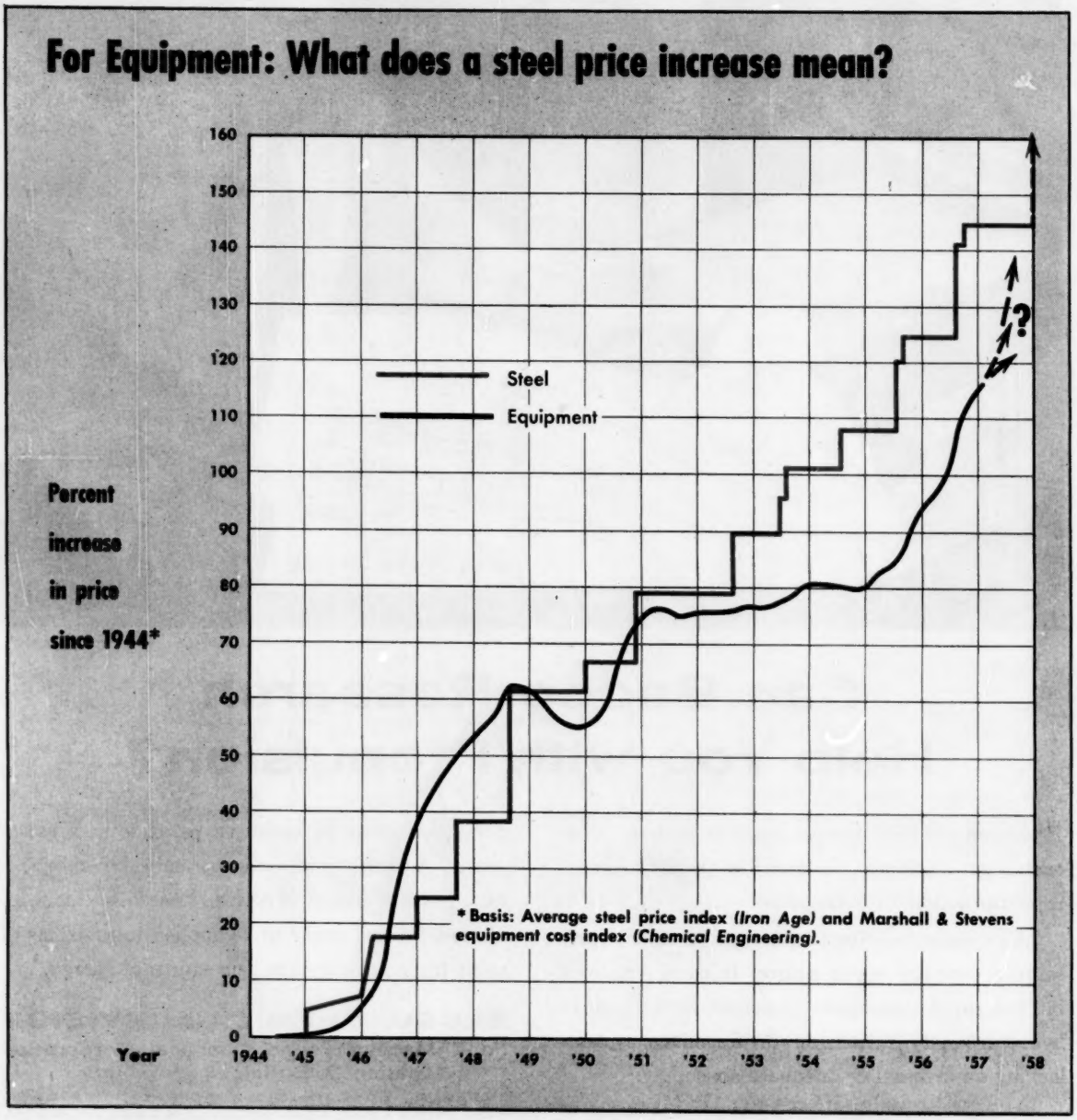

Equipment Prices Will Be Going Up

THE FACT that equipment prices are closely tied to those of steel is not news to chemical makers. So when steelmakers posted their new price schedules last week—with increases of about $6/ton—chemical producers counted on eventually digging deeper into their corporate pockets for equipment capital.

How Big, How Soon? For some time now, another increase in steel prices has been taken for granted: a clause in the steelworkers' contract calls for a cost-of-living adjustment. And steel companies almost certainly will pass the hikes along to their customers.

The big question right now is how big the increases will be and how soon the steel industry's customers will pass them along to their own customers. Some equipment makers are already starting to jack up their prices. A few posted higher schedules last month—in anticipation of a steel increase. But for the majority, there will be the usual time lag before the biggest

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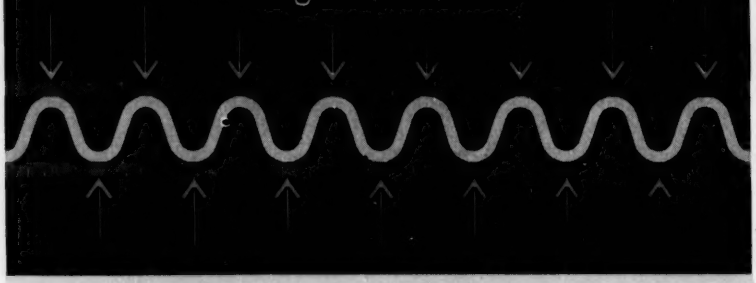
See The Atlantic Refining Company—Philadelphia, Providence, Charlotte, Chicago. In the West: L. H. Butcher Co. In Canada: Naugatuck Chemicals Division of Dominion Rubber Company, Ltd. In Europe: Atlantic Chemicals SAB, Belgium. In South America: Atlantic Refining Company of Brazil, Rio de Janeiro.

ATLANTIC
PETROLEUM
CHEMICALS

MIN CHEMISTRY *at work*

case: Corrugated board bond strength increased 8.7%* by simple addition of ASP 400 to glue formula



Mineral Additive Report: ASP 400 (M & C's Aluminum Silicate Pigment additive) was introduced in the double-backer glue formula on a machine making 38-47 lb. kraft—straw medium board. Results:

1. Substantial solids increase, but no change in viscosity.
2. Glue penetration positively controlled.
3. Stiffer, drier, harder sheet—with less drying time.
4. Stronger board—random samples given pin adhesion test showed improvements of 8.3%, 4.0% and 13.8%* over previous average for same board. ASP 400 now also used in single-facer mix.
5. Increased machine speeds made possible.
6. Reduced adhesive costs.

Do you convert paper into boards, laminates, tubes, cores or bags? M & C *process-engineers* adhesive additives to make things go smooth in your plant . . . good in your markets. Use the coupon.

*Details about test available on request

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factors—their own labor costs, and other items tied to steel, but indirectly —catch up to force their hands.

Best guess now: eventually, there will be hikes in costs of chemical equipment ranging between 5 and 10%. Most firms feel that it will be possible to hold the rise closer to 5%.

In general, the equipment price increase will probably be proportional to that of steel itself. But some say there might be a slight plus "for the middlemen." Others feel that profit margins on equipment are so narrow now that prices may go up more than they normally would.

Where It Hurts: One thing can be said with certainty: chemical companies are not happy about the prospects. Of course, many of them are becoming philosophical about such happenings by now.

A few companies on the Gulf Coast said they import much of their steel and will not be affected. About the happiest comments made last week, however, were by three separate chemical firms. One said that its major expansions were being completed "under the wire." The other two felt that all prices—including their own product prices—would be pushed upward; thus, they'd be no better or worse off than before.

What to Do? In any case, most chemical firms say there isn't much that can be done. There's the possibility, of course, of building up inventories now before price hikes go into effect. But most of them think there is nothing to gain that way.

A typical comment: "We can't get delivery on equipment in less than 8-12 months. So what's the use? Most contracts include an escalator clause, and we'd pay the increase anyway."

A few companies do report they've stocked up "moderately" on certain items needed for day-to-day maintenance. But they were the exception. Typical comments:

"We don't plan to change our buying habits just because of a change in the price of steel."

"We keep a steady inventory. It doesn't pay to buy more than we need —handling costs too much."

"Inventories are being cut down rather than increased, because of the tight money situation. . . . Building up inventories to beat a price rise . . . usually costs more in the long run."

A few firms cited equipment ob-

solescence as a reason for holding inventories down. Design and engineering, they say, are the big cost factors; metal is only a secondary factor.

Escalator Trends: Although some equipment makers say that they don't use escalator clauses (one construction firm says it is still able to get firm prices on about 75% of equipment it buys), the trend is in that direction.

Nevertheless, the equipment makers have a stock answer: "We don't like escalator clauses any more than the buyer does. But our profit margin is so low we have to resort to them in order to stay in business."

The chart (*p. 40*) seems to add some credence to that statement. For, though most people are inclined to remember the rapid advance in post-World War II prices and since the end of 1954, few recall that equipment makers actually did hold prices down with some degree of success from '51 through '54. Because of this, the average equipment price increase since '44 has been somewhat below that of steel.

A few heavy-equipment makers reported that their prices hugged steel tag increases closely, and even those who held prices down admitted the effort wasn't premeditated, that stiff competition forced them to.

There was evidence of this competition just before the Korean War. A slump in business caused equipment prices to drop. And after the sharp upturn in '50, equipment prices hit a plateau, then drifted upward very slowly, while the cost of steel continued to jump rapidly. Something had to give—and it was equipment prices that began a rapid ascent after '54.

Another Break? In spite of the actual, and predicted, equipment price rises, at least one buyer sees signs of a buyers' market in the offing, once some of the manufacturers' backlogs have been reduced. One equipment manufacturer seems to go along with this, says business is becoming "rather conservative." Another is worried that it may have hiked prices too much already, says profits have held up but sales haven't.

But the furrowed brows aren't too numerous. Most chemical firms and equipment manufacturers feel that there is little they can do to break the pattern. As long as steel prices keep going up, these increases will continue to be passed along to the ultimate consumers.

Superiority of GROCO 2 RED OIL revealed in unretouched photograph of low temperature test. Samples of GROCO 2 (left) and competitive red oil (right) were refrigerated at 36°F. for 24 hours side by side. No solids separated out of GROCO 2 RED OIL—it remained so transparent that technician's fingers and steel tray are clearly visible through vial. On right, solid acids separated in large amount.

Titre Is Lowest In GROCO 2 Red Oil

GROCO 2 RED OIL's exceptionally low content of saturated fatty acids—titre 3°C.—is advantage enough in itself to make it top choice for many processors. More than one producer of a liquid shampoo, for example, prefers GROCO 2 because it gives a formulation that stays liquid at low temperatures.

Equally outstanding is its oxidation stability. In the Mackey Test, GROCO 2 remained under 105°C. for 5 hours. There are no oxidation discoloration problems when you formulate with GROCO 2. And there is an absolute minimum of unusable components, making GROCO 2 the best money value of any red oil in its class.

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EQUIPMENT

Zirconium Fittings: Welding fittings of zirconium and Zircaloy 2 have been forged by Tube Turns, a division of National Cylinder Gas Co. (Louisville, Ky.) —the first time it's been done, Tube Turns believes. The elbows have an O.D. of 1½ in. and a wall-thickness of 0.065 in., were designed for a nuclear-reactor application.

•

Steam Cleaner: For light-duty, general-utility cleaning, Clayton Mfg. Co. (El Monte, Calif.) recommends its new Clayton-Kerrick 60 Handyman steam cleaner. The unit has a 60 gal./hour capacity, operates on any water pressure, requires no auxiliary pump.

•

Filter Cartridge: The Hilliard Corp. (Elmira, N.Y.) is out with a new filter cartridge for oil, water and other liquids. It permits high flow rates and low pressure drops. Called Type PL, the cartridge is made of pleated filter paper impregnated with a heat stabilizing resin and formed around a metal center tube. End plates and a protective shield are attached. Particles down to 5-micron size can be filtered at full flow, finer particles with continuous recirculation.

•

Gas-Density Balance: The 3A Gas Density Balance is a new instrument made by Arnold O. Beckman, Inc. (South Pasadena, Calif.), for controlling process streams where density provides an index to other gas-stream properties. Examples: continuous density measurements of hydrocarbon streams, hydrogen readings on hydrogen-blanketed generators. The instrument has 95% response in less than one minute, sensitivity of ½% of full scale, accuracy of 1½% of full scale.

•

Pressure Controller: Bellofram Products Corp. (Burlington, Mass.) says its new Bellofram Type 10 Air Gaging Manostat gives precise downstream air-pressure control over a wide variation in supply pressure. The controller is operated by a high-gain servo system with the main-valve action controlled by a pilot nozzle activated by slight pressure variations. The unit's resolution is 1 part in 10,000 of range; repeatability is usually less than 1 part in 5,000 of range. Ranges available: 2-25 and 3-60 psi., ⅛- and ¼-in. pipe sizes.

•

Temperature Regulators: Watts Regulator Co. (Lawrence, Mass.) is out with a new line of single-seated automatic temperature regulators for liquids and steam. The 155 series is direct acting, maintains the liquid temperature by controlling the heating source (e.g., steam). The 157 series is reverse acting, maintains the liquid temperature by controlling the cooling source (e.g., water). Both types will control temperature within a 40-degree operating range between 100 and 240 F. Sizes: 155 series, ½ to 1½ in.; 157 series, ½ to 1 in.

Air Cleaners: A new line of electronic air cleaners for installation in forced-air heating, cooling or ventilating systems is available from Electro-Air Cleaner Co., Inc. (Pittsburgh, Pa.). Called the Hi-C line, the units are said to remove up to 97% of dust and other particles from the air, are designed to fire an ionizing electron barrage against the inside curve of the negative electrode, creating an increased area of ionization. Horizontal- and vertical-flow models with automatic or manually controlled self-cleaners are offered.

•

Diaphragm Pump: Denver Equipment Co. (Denver) says its new 4-in. adjustable-stroke diaphragm pump provides a longer stroke and up to 75% greater capacity than other models. It is only 50 in. high; simplex comes in capacities to 70 gpm., duplex to 140 gpm. at ¾ to 1 hp. Acidproof construction is available.

•

Aluminum Joining: For aluminum joining, Eutectic Welding Alloys Corp. (Flushing, N.Y.) has come up with EutecRod 999FC alloy. Advantages cited for the alloy: exceptional workability, low bonding temperature (about 1050 F), deposits can be run in vertical and overhead positions.

•

Repair Kit: Its new emergency repair kit containing Plastic Steel for on-the-spot repair of tanks, pipes, pumps, valves and other equipment is now available through industrial supply dealers, says Devcon Corp. (Danvers, Mass.). Included in the kit: 1 lb. of Plastic Steel, hardening agent, release agent, rubber-covered steel patch, treated glass tape and measuring spoons. Devcon claims Plastic Steel is as easy to use as modeling clay, hardens in two hours (one minute or less with heat). For repairing large holes or corroded areas, the glass-tape bandage is recommended for use in conjunction with the material.

•

Hermetic Seals: Consolidated Electrodynamics Corp. (Pasadena, Calif.) offers a new ceramic material called Ceramicite, for hermetic seal applications at temperatures up to 700 F. Consolidated says Ceramicite bonds physically to most stainless steels, has a similar rate of thermal expansion, is able to withstand severe physical and thermal shocks without leaking or cracking.

•

Teflon Coatings: Metalweld, Inc.'s Protective Coatings Division (Philadelphia), working in conjunction with United States Gasket Co., has developed new techniques for application of USG's line of cementable Teflon to a variety of surfaces. The coatings are particularly suited for bulk-handling equipment, impart nonstick, abrasionproof characteristics to surfaces of hoppers, feeders, chutes, etc. MW suggests that it may also be used as tank, mixer, fume-hood and duct liners, laboratory bench coverings.

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35% Copper as metallic packaged in steel drums at no extra cost.

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37% Copper as metallic. Available in polethylene-lined drums or bags.

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Minimum 76% Copper as metallic. Technical grade . . . NOT A BY-PRODUCT.

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LIQUID SULFUR DIOXIDE
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Iron less than 1.0 ppm as loaded. Water white. Delivered in glass-lined tank wagons, also in stainless steel drums.

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Other organic Sulfonic Acids.

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36% Zinc as metallic. White, free flowing powder.

ZINC OXIDE
Secondary Zinc Oxide.

MANGANESE

MANGANESE SULFATE
65% Mn SO_4. Designed specifically for inclusion in mixed fertilizer.

MONOHYDRATED MANGANESE SULFATE
93% Mn SO_4. H_2O. Highest purity, technical grade . . . NOT A BY-PRODUCT.

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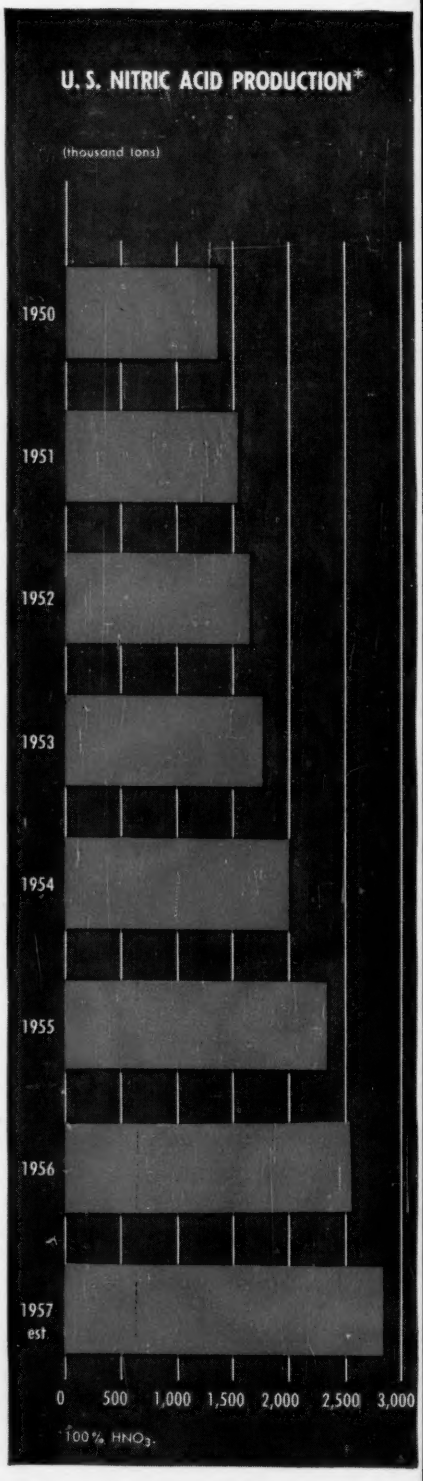
Minimum 48% Manganese as metallic. Feeds, fertilizers, spray or dust grades.

Estimated 1957 U.S. Nitric Acid Capacity

COMPANY	LOCATION	CAPACITY (thousand tons/year)
Allied	Buffalo, N.Y.	25
	Hopewell, Va.	425
	Newell, Pa.	40
	Omaha, Neb.	85
	South Point, O.	240
	Hanford, Wash.	20
American Cyanamid	Bound Brook, N.J.	25
Apache Powder	Curtiss, Ariz.	20
Ames Chemical	Glens Falls, N.Y.	less than 1
Atlas Powder	Atlas, Mo.	30
	Reynolds, Pa.	25
Brea	Brea, Calif.	50
California-Spray	Richmond, Calif.	85
Calumet Nitrogen	Hammond, Ind.	40
Cooperative Farmers	Lawrence, Kan.	75
Chemstrand	Pensacola, Fla.	50
Commercial Solvents	Sterlington, La.	135
Du Pont	Mineral Springs, Ala.	10
	Louviers, Colo.	10
	Gibbstown, N.J.	220
	Orange, Tex.	70
	Seneca, Ill.	40
	Du Pont, Wash.	20
	Belle, W. Va.	40
	Barksdale, Wis.	20
Escambia	Pensacola, Fla.	80
Hercules	Bessemer, Ala.	20
	Hercules, Calif.	50
	Kenvil, N.J.	20
	Parlin, N.J.	50
Ketona	Tarrant, Ala.	30
Lion Oil	Eldorado, Ark.	195
	Luling, La.	165
Mississippi Chemical	Yazoo, Miss.	115
Mississippi River	Selma, Mo.	90
Monsanto	Everett, Mass.	15
Northern Chemical	Searsport, Me.	25
National Distillers	Tuscola, Ill.	35
Olin Mathieson	Lake Charles, La.	70
Phillips	Etter, Tex.	125
Southern Nitrogen	Savannah, Ga.	85
Spencer	Pittsburg, Kan.	225
	Henderson, Ky.	40
	Vicksburg, Miss.	85
Sohio	Lima, O.	65
St. Paul	St. Paul, Minn.	70
TVA	Muscle Shoals, Ala.	150
Texas	Lockport, Ill.	75
U. S. Steel	Geneva, Utah	55

Nitric Capacity:



Doubled Since '51—More Needed by '60?

By the end of this year, new nitric acid installations—and expansions—will push total U.S. commercial (i.e., nonmilitary) capacity to a record high of 3.7 million tons/year. It's a whacking 100% increase in less than six years; '51 capacity was but 1.8 million tons.

Contributing to the upcoming increase this year are:

- Spencer Chemical's spanking-new 40,000-tons/year plant at Henderson, Ky., that's just about due to start operations.
- Du Pont's newly built nitric acid plant (also 40,000 tons/year), at Belle, W. Va., due in later this year.

All told, by the end of '57, there'll be a total of 49 nitric plants in the U.S. More than half—29 to be precise—are built adjacent to ammonia units. Practically all of the acid commercially produced, of course, is captively consumed at synthetic ammonia plants; relatively little hits the commercial market. And with nearly all of the nitric currently being made by pressure oxidation of ammonia—as opposed to the now obsolete method of reacting sulfuric acid with sodium nitrate—it's clear why the recent surge in synthetic ammonia has been paralleled in nitric acid production growth.

In the years 1956 and '57, 11 new installations (incuding Spencer's and Du Pont's) will have added about 700,000 tons/year to the total U.S. capacity. Total production of the acid will probably amount to about 2.8 million tons in '57—a record high output but representing only about 80% of capacity operation.

Trying to evaluate the industry's growth by considering percentage of capacity operations, of course, can be misleading. In '51, for example, the nitric industry was running at about 88% of capacity, but production totaled only about 1.5 million tons; last year, the rate was 84%, which tallied to an output of 2.5 million tons.

Fertilizers Out Front: The rash of new plants and expanded installations doesn't seem to be causing much concern among present and potential nitric producers—bulk of the anticipated 2.8 million tons of '57 production, they believe, will be used.

(At the moment nitric acid movement is being described as "not too brisk," but sales are beginning to pick up, due largely to the current upswing in steel production and agricultural needs. Significantly, producers last week posted an increase in nitric prices on the West Coast and in other areas west of the Rockies. New prices are now on an $87/ton rate (100% HNO_3 basis, up $9/ton over the previous Western quote.)

The fertilizer industry, long the top nitric consumer, is pegged to absorb a good 75% chunk of this year's total nitric output. Two important reasons: the continuing trend toward use of greater amounts of nitrogen as a plant food; stepped-up demand by U.S. farmers for solution fertilizers.

Recently released government figures indicate that over-all nitrogen use in fertilizers fell off some in the '55-'56 agricultural year, compared with '54-'55, but the drop came to less than 1.5%. Actual figures: 1.93 million tons vs. 1.95 million. The dip, of course, reflects last year's shaky farm situation, and though the situation hasn't yet cleared up completely, few nitrogenous fertilizer producers appear too concerned. Says one, "The over-all trend toward use of nitrogen fertilizers looks better than ever."

There may be justification for the optimism. Some observers are convinced that as much as 3 million tons/year of nitrogen will be applied to domestic farms by the end of the decade. And nitric acid should benefit by such applications through ammonium nitrate, the acid's most important end-use.

Ammonium nitrate is second only to anhydrous ammonia as a source of nitrogen for soil fertilization; production—and use—of the former has been heartening. Last year, output of the nitrate amounted to some 1.8 million tons, while in '50 it was a shade over 1 million. It's been estimated that production of fertilizer-grade ammonium nitrate should easily hit about 2.8 million tons by '60—an impressive 180% increase for the 1950-60 decade.

Wet vs. Dry: Slated to contribute perhaps the greatest nudge to use of ammonium nitrate (as well as to use of anhydrous ammonia and urea) is the growing preference for solution fertilizers. About 20 years ago, only 15% of nitrogen directly applied for soil enrichment was in solution form. Currently, the figure is closer to 60%; but by '60, 70% of fertilizer nitrogen directly applied will derive from solutions. It's one good reason behind current—and future—nitric acid expansions.

While the fertilizer market for nitric looks generally favorable, one point has dampened a once widely held hope—anticipated use of nitric acid for phosphate rock acidulation. A few years ago, the industry was excited over nitric's prospects as a substitute for sulfuric in phosphate rock processing, but the exuberance petered out when an easing sulfur situation (after the Korean War) brought about a reversal of sulfuric acid's tight supply position. The latter's continuing availability has firmly entrenched it as the leader in rock acidulation processes, brought about a bypassing of nitric use methods.

Up for Explosives: Today, about 15% of the nitric acid consumed goes into industrial explosives.

This year, sales of explosives should top, by at least 10%, last year's record of more than a half-million tons and contribute to a concomitant hike in nitric use (*see p. 48, end-use pattern*). Behind the growth in explosives: surge in coal mining, quarrying, metal and nonmetal mining, heavy construction, and petroleum exploration uses.

One interesting development in the explosives field is the increasing use of fertilizer-grade ammonium nitrate (rather than the more expensive technical grade) as a blasting agent. The development has caused a stir in the nitric acid industry as well as among manufacturers of industrial explosives. The trade is cautious, though, about too much publicity on the switch in

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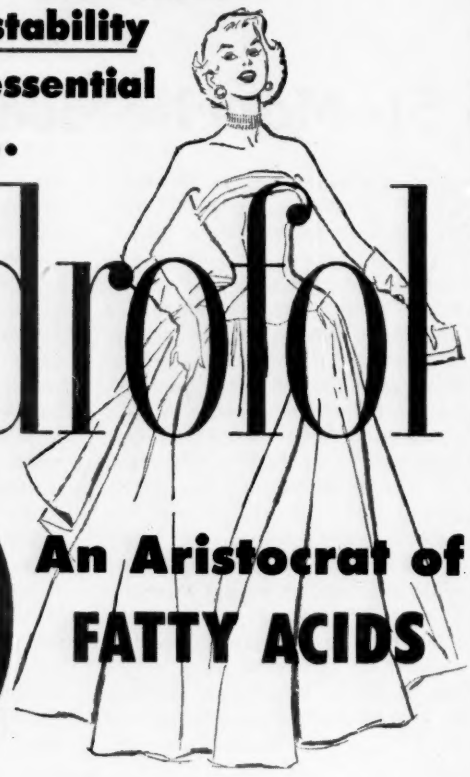

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Saponification Value	202 to 207
Average Molecular Weight	272 to 278
Specific Gravity @ 100/25°C	0.835
Color 5¼" Lovibond	Max. 10Y/1R

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Nitric Acid End-Use Pattern

(1957, estimated)

Use	Thousand Tons
Fertilizer	2,150
Explosives	475
Other	280

grade preferences; there's concern that playing up the use of fertilizer ammonium nitrate for explosives may give rise to unfounded fears by fertilizer users.

The new form of blasting agent, however—though using ammonium nitrate as the chief ingredient—must be mixed with oil and set off by a primer stick (*CW, June 15, p. 44*).

Other Nitric Uses: Nitric continues to find wide application in a raft of industrial outlets. Among the leaders in the "other" category: synthetic fibers, plastics, dyes, stainless steel pickling, and steel refining.

Coming up on the outside, though, is a nitric outlet that may well vie with explosives as the No. 2 user—uranium metallurgy. The hot nuclear energy race (for defense and civilian uses) is accenting the need for feasible—and economical—methods of extracting uranium in its purest form. Most of the methods in use or being tested (such as ion exchange and solvent extractions) use nitric acid. Thus, no matter which process eventually wins out as the most suitable, the acid will benefit. So potent is the probability of a hefty consumption of nitric in uranium metallurgy that one well-known builder of ammonia-nitric plants is reportedly using this pitch to interest nitric plant customers.

Whether or not the latter use ever becomes a real source of profit for nitric producers, the established—and expanding—outlets in agricultural, explosives, and in other segments of the chemical process industries, will continue to spark an upward climb. Fact is, some market followers aren't averse to making a small wager that the current lineup of plants (*see p. 46*) may be too few to adequately meet all requirements for nitric three years hence. And they may be right.

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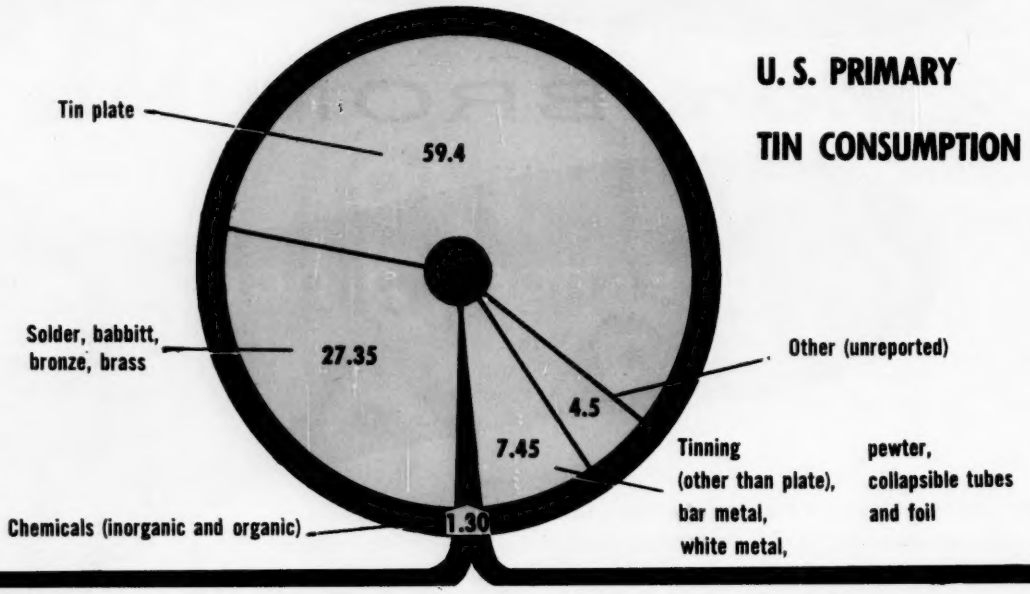
† A joint-venture project of Michigan Chemical Corporation and Murphy Corporation of El Dorado, Arkansas



Here's where tin suppliers see a big potential growth—via research

BOX SCORE ON ORGANO-TIN RESEARCH

Group Structure	Typical Compound	Known Use (Example)
R_4Sn	tetraphenyltin	mothproofing textiles
R_3SnX	tri-n-butyl tin hydroxide	paint fungistat
R_2SnX_2	dibutyl tin diacetate	stabilizer for polyvinyl chloride
$RSnX_3$	butyl tin trichloride	none yet
$R_3Sn\text{-}SnR_3$	hexabutyl di tin	none yet
$(R_2Sn)y$	dibutyl tin monomer	none yet

Source: U. S. Bureau of Mines.

Organo-tins: The Little Slice with Big Hopes

Now in plentiful supply,* metallic tin is looking for new uses and depending largely on organic chemical research to find them. That's not as surprising as it may seem, in view of the healthy growth in the manufacture and use of organo-tin compounds (*CW, Nov. 17, '56, p. 144*). And organo-tin chemistry is becoming less esoteric every day, opening the way to new, potentially valuable compounds.

*For several reasons: cessation of government stockpiling, uninterrupted shipments to the U.S., "overproduction," planned expansion by tin producers.

Only about 0.1% (60 long tons) of last year's total U.S. primary metallic tin consumption went into organo-tins. But that figure is **rising** (it climbed 30% in the last three years) as organo-tin chemicals strengthen their holds on current applications. They're now used in textile treating, stabilization of rubber paints and polyvinyl chloride plastics, as drugs and biocides (fungicides, insecticides, herbicides). Researchers both here and abroad, moreover, are looking for new uses as well as new compounds.

Chemical Update: Six major types of tin compounds (*see above*) are dominant in this effort. (So far, di-aryl and alkyl and the tri-aryl and alkyl compounds have enjoyed the greatest commercial success.)

The scope of organo-tin research is reflected in such recent advances as the discovery by G. J. M. van der Kerk and J. G. Noltes, of the Tin Research Institute's (England) Institute for Organic Chemistry, T. N. O. (Utrecht, Holland), of a synthesis for making new types of organo-tins. The

METAL & THERMIT'S HIRSCHLAND: Singular advantages outweigh high cost.

method utilizes the hitherto little-used organo-tin hydrides, involves their addition to unsaturated organic compounds. Triphenyl tin hydride, for example, yields potentially useful addition products with such compounds as acrylonitrile, allyl cyanide, crotonitrile, acrylamide, methyl acrylate, allyl alcohol, acroleindiethyl acetal, vinyl acetate, styrene, among others.

In general, compounds formed this way are stable, and easily made in high (over 80%) yields. Van der Kerk believes that "quite unexpected properties leading to further applications that are at present hidden" may be found in the new compounds.

Also significant is the increase in academic organo-tin research. Such projects are under way at Harvard University, Drexel Institute (Philadelphia), Iowa State College, Birkbeck College (London), etc., and are becoming more widespread, geographically.

Tin Specialists: A center of industrial organo-tin research in the U.S. is Metal & Thermit Corp. (Rahway, N.J.), which specializes in chemicals derived from tin, antimony and zirconium. M&T's research director, H. Hirschland, considers only three of the many possible syntheses to be feasible for commercial organo-tin production. They are: (1) Wurtz, (2) Grignard and (3) direct reaction (e.g., methyl chloride reacts at high temperatures with metallic tin to yield dimethyl tin dichloride).

Researchers in this field say that only compounds containing a carbon-to-tin bond are properly termed organo-tins. Of these, Hirschland considers tetravalent tins of prime interest, rules out disubstituted and hexasubstituted di-tins as having no commercial value (they are easily oxidized).

Hirschland feels that Metal & Thermit has an edge in production of these materials because it has a detinning operation (of scrap tinned metal) that yields low-cost tin. Companies that must buy pig tin (at about $1/lb.) aren't enthusiastic about getting into organo-tin production right now. Hirschland, however, feels that as new organo-tin uses are found, competition is bound to broaden.

The cost of tin is the big reason why organometallic-minded Ethyl Corp. (New York) reports it is doing no organo-tin research, why Union Carbide (which markets one organo-tin, a stabilizer) isn't pushing research in this field, either.

Toxicity is another, though less serious, problem in making and handling tin compounds. Tetraethyl tin, like tetraethyl lead, is extremely toxic. Tetrabutyl tin, on the other hand, has little effect on laboratory animals. Organo-tin halides are irritants, as is tributyl tin oxide.

Hirschland, however, believes the singular advantages of some tin compounds outweigh their cost. Stabilizers such as dibutyl tin dilaurate, dibutyl tin maleate, and dibutyl tin diacetate are unrivaled for use in clear polyvinyl chloride, for example. PVC stabilizers, incidentally, now account for the largest portion of organo-tin sales, and a lot of research.

For example, a new British patent (773434)† covers thiomalates of dialkyl and trialkyl tin, their production, and their use as stabilizers for halogenated vinyl resins.

Biocidal properties are also helping to expand organo-tin markets, are among the first properties looked for in new tin compounds. Tri-n-butyl tin hydroxide is a successful paint fungistat, triethyl tins are increasingly popular agricultural fungicides. In general, lower-molecular-weight compounds are the best fungicides (e.g., n-butyl and n-propyl tri-substituted tins). Tri-n-octyl tin acetate, for example, is comparatively ineffective.

Fungicidal activity has been found to be influenced more by the total number of carbon atoms in all three alkyl groups than by the size of any one group. These findings are patterns for future research projects on tin fungicide.

Organo-tins are also finding markets in veterinary medicine (anthelmintics), slime control, catalysts for silicone polymerizations, and various other unrelated fields. Such gains as these are bolstering the optimism of tin researchers seeking to cultivate a tidy crop of new products.

† Issued to S. A. des Manufactures des Glaces et Produits Chimiques de St.-Gobain, Chauny et Cirey (France).

Exit Transistors?

This week, the Naval Ordnance Laboratory (Silver Spring, Md.) took the wraps off "solions" (short for "ions in solution"), fluids that may eventually take over jobs from transistors and vacuum tubes. Solions utilize the movement of electrons through a liquid instead of through space, as in vacuum tubes, or through a solid, as in transistors.

In the solions made at NOL, electrical current is generated by the movement of ions between electrodes in a potassium iodide-iodine solution. A low current is used to initially excite the device, but the current is sustained and varied by temperature, pressure, light, sound or acceleration.

Solions, according to NOL, require extremely low power, have great sensitivity and accuracy.

EXPANSION

• Air Reduction Co. has broken ground for a $500,000 polymer research laboratory at Murray Hill, N.J. The two-story lab, expected to be ready late this year, will bring 35 new staffers to Airco's Murray Hill research center, which now employs 325.

• Food Machinery and Chemical Corp. will expand its chemical research and development for the armed forces, is moving this activity from the company's Becco Chemical Division (Buffalo, N.Y.) to larger quarters in the Navy-owned Admiral building in Buffalo.

• The Linde Co.'s laboratories in Tonawanda, N.Y., are embarked on a new biochemical research program. First projects: experiments in the preservation of blood and blood components; research in the effects of low temperatures and high pressures on living cells. Arthur Rinfret (formerly of the University of California Medical Center) heads the new biochemistry group.

• L. Sonneborn Sons, Inc. (New York) has doubled its research facilities at its Petrolia, Pa., refinery. Called the Breth Laboratory (after the late Ferdinand Breth, long-time technical director of the company), the new facilities will extend Sonneborn's research in white mineral oils, petrolatums, microcrystalline waxes and petroleum sulfonates. A pioneer in white oil production, Sonneborn now feels a good part of the firm's growth potential lies in the allied fields of laminating waxes and detergent sulfonates.

• Du Pont plans to build a new research laboratory at its plant site in Niagara Falls, N.Y., estimates cost of the building and equipment at $2.5 million. About 100 staffers will occupy the new lab; they will be moved from present facilities in the plant area.

• R. O. Hull and Co. (Cleveland, O.) plans a new laboratory at Stark Industrial Park (Charleston, S.C.) to research chemicals and equipment for electroplating.

• Petrolite Corp. (St. Louis, Mo.) has opened petroleum products research facilities at Webster Groves, Mo., to serve the firm's Tretolite, Petreco and Bareco divisions.

• Stanford Research Institute (Menlo Park, Calif.), has completed a new $50,000 plastics research lab, will use it to synthesize and evaluate new polymers, conduct research on effects of radiation on polymers, study high-temperature plastics, silicones and plastic film lamination.

PRODUCTS

Phenolic Monomer: Trimethylolphenol is now available in sample quantities from the Bakelite Co., division of Union Carbide. It is a water-soluble monomer, forms plastic alloys with urea melamine, polyamino com-

New Fuel Element Turns a Profit

Five thousand newly developed nuclear fuel elements like the one held by Lee Davenport (*above*), president of Sylvania-Corning Nuclear Corp. (Bayside, L.I., N.Y.), will be delivered to Brookhaven National Laboratory (Upton, N.Y.) in the next 10 months. The contract, totaling about $250,000, is the largest yet for commercial non-military fuel elements, stems from Brookhaven fuel-element studies, headed by laboratory director Leland Haworth (*left*).

The elements are composed of enriched uranium-aluminum fuel plates fabricated at Sylvania-Corning's Hicksville, L.I., N.Y., pilot plant, will be used in the Brookhaven research reactor (*above*). They use more available U-235, operate at lower temperature than their predecessors (*CW, April 13, p. 63*).

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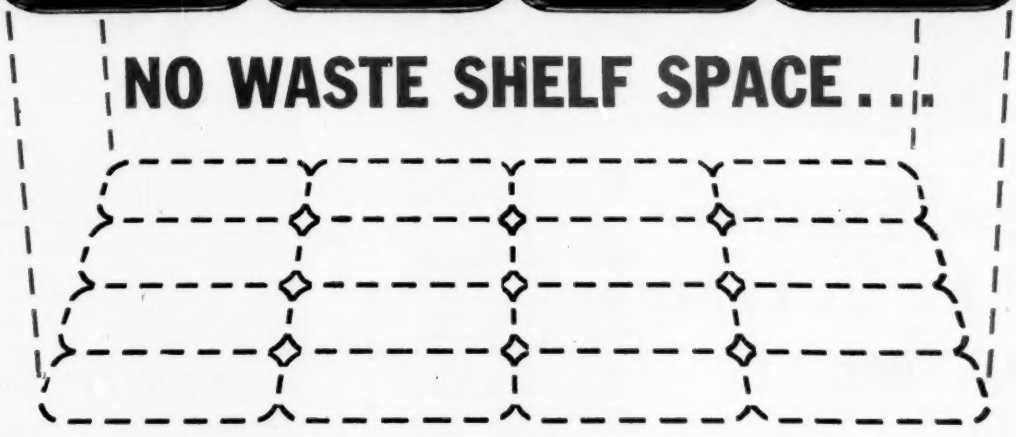

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RESEARCH

pounds, etc., has potential uses in coatings and adhesives. Cost: 35¢/lb. in 70% water solution.

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Lube Additive: Phenyl stearic acid, reportedly of value in aviation lubricants and rust-preventive greases, is offered in commercial lots by Barlow Chemical Corp. (Ossining, N. Y.).

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Dye Carrier: Tanatex Corp. (Kearny, N. J.) is out with a new carrier named Carolid, which aids dyeing of hydrophobic fibers, features handling ease, nontoxicity.

REPORTS

These new reports are available from the U.S. Dept. of Commerce, Office of Technical Services (Washington 25, D.C.):

• "Infrared Spectra of Some Salts of Organophosphorus Acids" (PB 121835, 75¢) describes research leading to simplified identification of the subject salts in mixtures.

• "The Silver Oxide-Zinc Alkaline Primary Cell: Part 4, Anodic Charateristics of Zinc Alloys" (PB 121744, 75¢) reports that most alloying elements decrease cell capacity, particularly if they are present in appreciable amounts. Mercury, however, improves capacity, and a few other elements, such as cobalt and calcium, show promise. The most effect on cell capacity, states the report, stems from the grain structure of electrodes made of zinc and its alloys.

• "Gamma Ray Induced Addition of Bromotrichloromethane to Olefins" (PB 121279, 50¢) covers irradiation in organic synthesis as applied to the preparation of intermediates for monomers to be used in the polymerization of high-temperature-resistant elastomers for aircraft. Radiation proved a potent source of free radicals to initiate the reaction, gave good yields.

• "The Preparation and Properties of Some Fluorine-Containing Diesters" (PB 121910, $1) describes the preparation of new compounds for possible use as high-temperature lubricants and hydraulic fluids. Six different types of fluorine-containing diesters were prepared, proved resistant to hydrolysis, were derived from fluorine-containing alcohols or glycols and hydrocarbon acids.

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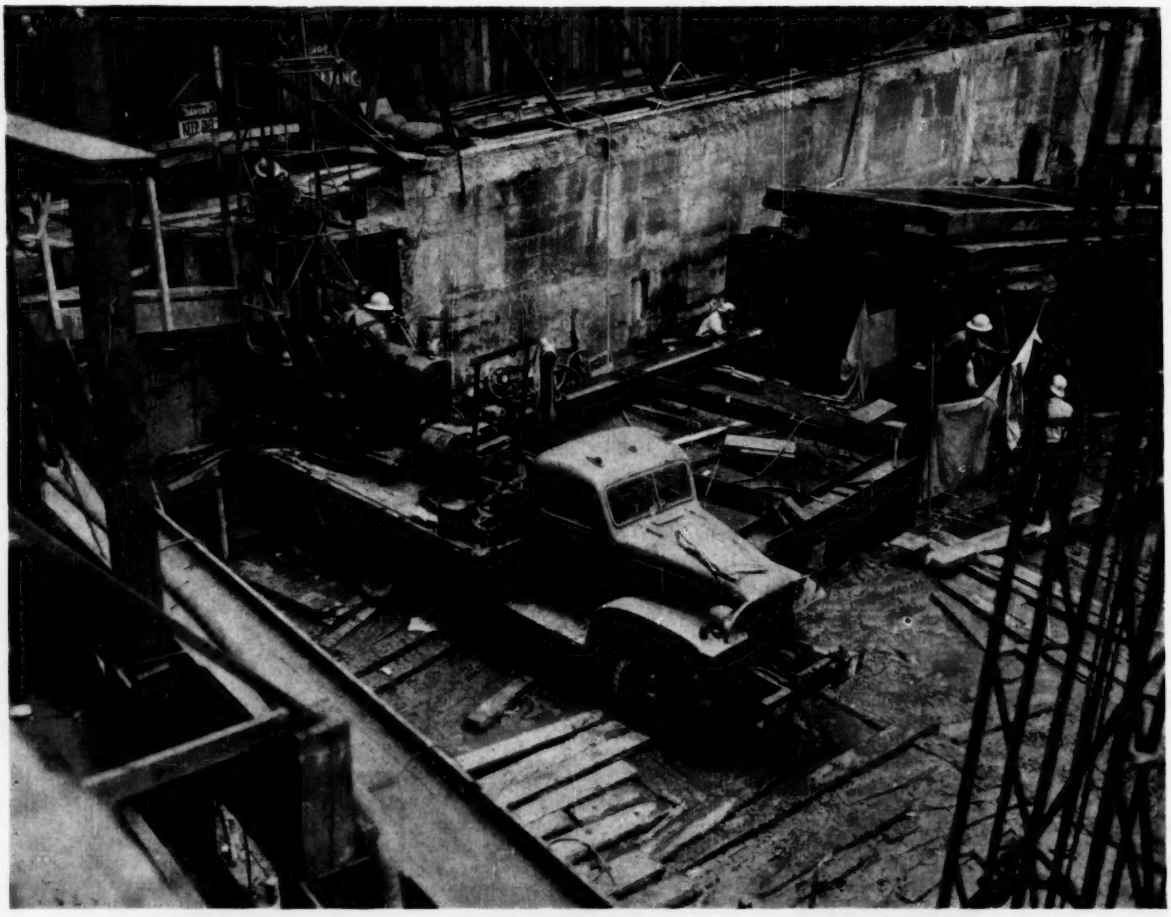


SKYSCRAPER EXCAVATION: Two chemicals keep subways, nearby buildings in their place.

Solid Business Builds on Shaky Foundations

Sales executives of Allied Chemical's Solvay Process Division, on after-lunch strolls in Manhattan's Wall St. district, are taking more than sidewalk superintendents' interest in the erection of the 60-story Chase Manhattan building. Although still in its initial stages of construction, the building has already been a big devourer of calcium chloride, a Solvay product. And the completed skyscraper will depend on a pair of chemicals to stabilize the soil beneath the building. Object: to prevent sliding or shifting of close-by subways and adjacent buildings.

Helping to provide protection against ground water during excavation is a thoroughly proved process that utilizes solutions of sodium silicate (furnished by Philadelphia Quartz) and calcium chloride (about 1 gal. of silicate to 0.8 gal. of chloride) to form a gel. This gel turns slushy, sandy subsoil into a mass with the consistency and load-bearing strength of sandstone.

Engaged in the project is Chemical Soil Solidification Co. (Chicago), which has had 15-man crews working around the clock pumping the chemicals into the ground. The company—which figures it has about 90% of the nation's soil stabilization business—is almost finished with its work now. It has pumped some 46,000 gal. of sodium silicate solution into the project —or about 10 to 15 gal. for each vertical foot (with a diameter, around the injection pipe, of 28 to 42 in.) of soil treated. Figuring 5 lbs. of calcium chloride per gallon of solution, about 184,000 lbs. of the chemical have been added.

To get this material into the ground, the company drilled a hole, put in a 2½ in. casing, then ran an injection pipe with a driving head down into the casing. When the pipe was at the lowest point (about 50 ft. below the working surface), the driving head was knocked off, leaving an open end pipe through which the gel-forming material was run. The casing was then removed.

About 10-15 gal. of sodium silicate were pumped in (at a pressure of 80-

150 psi.) first, followed by about ½ gal. of water to clear the line, then by calcium chloride solution (mixed on the job site). The same procedure was followed at 1-ft. intervals for the whole width of the troublesome subsoil. Pipes were sunk around 30 in. apart to provide plenty of overlap of treated areas.

The job on the Chase Manhattan building has been tougher than normal, but so far has shown excellent results. Some of the building's cofferdams are down to bedrock now, and only one minor case of leakage has been reported.

Besides the obvious advantage of providing a firm soil in which to prepare the foundation (final product has approximately a 550-lbs./sq. in. compression strength), the process also eliminates the need for excavating under air pressure (to keep water out).

Nylon in New Role

Nylon, the pioneer textile and molding resin, may soon be showing up in a raft of new applications. Among them: priming paints for metals, waterproofing resins for paper, heat-sealable coatings for foil. Pointing for these new tasks is a 10% nylon-in-water dispersion, called Genton 110, developed by General Dispersions, Inc. (Paterson, N. J.).

Genton 110 has already made its mark in the textile field. There, it has proved particularly useful in bonding synthetic fiber threads so that they don't untwist. Another application is in providing a bond for loose-weave textiles (of a variety of fiber types) so that they are more readily handled, more durable. And it has also proved to be an effective anticrease agent for drip-dry cottons. General is one of several firms working on nylon dispersions for textile uses.

In its versatile new dispersion, General (an affiliate of General Plastics Corp. created two years ago to develop the nylon dispersions) feels it has a product with several advantages over conventional nylon dispersions. The latter—produced by dissolving Du Pont's Zytel 61 nylon resin in alcohol, adding water and vacuum-distilling off the alcohol—have not been easy for some firms to make. General, also using Zytel 61, believes its patent-applied-for process is better suited for commercial production, provides a higher yield, gives a more stable, easy-to-apply product.

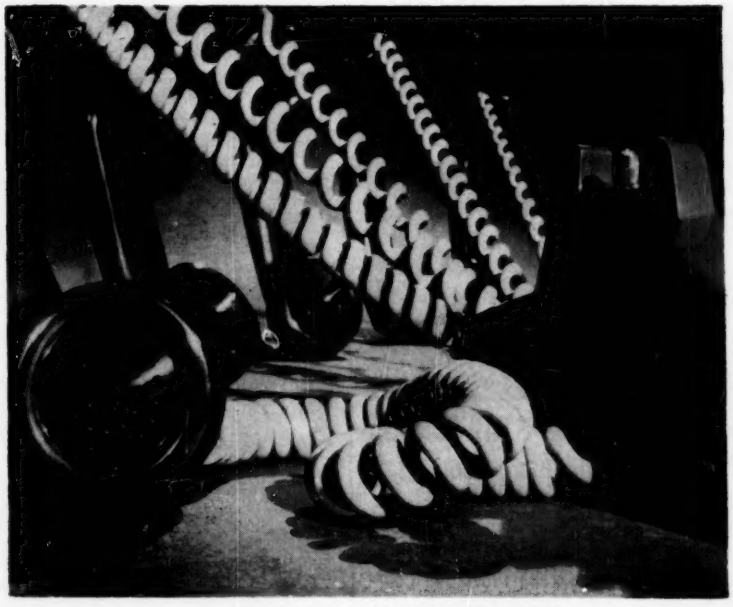
General won't describe its process until patents are granted. The dispersion it produces, however, is water-thin, milky, and of almost neutral pH. It can be tinted with either dispersed pigments or dyes, and produces translucent, flexible films.

Easy Handle: Water-based, hence low in fire hazard, the nylon coating features extreme ease of application. For such jobs as priming metals, moisture- and greaseproofing paper, coating metal foil, jacketing glass bottles (aerosols) and flash-bulbs, the application system is the same: the dispersion is sprayed on with a conventional gun at conventional pressures. The prime requisite is a very clean surface (phosphatized surfaces are good).

The item to be coated should be preheated—warming to about 160 F insures rapid evaporation of the moisture, improves adherence. The film dries in 1 to 15 minutes, depending on thickness. After-baking isn't necessary, but it does improve adherence (on the other hand, special formulations of nonbaked coatings make easily strippable films).

In suggesting its Genton 110 for metal coating, General stresses the ease of controlling film thickness.* A quick pass with a spray gun gives a film less than 1/10 mil thick, but repeated passes speedily build the layer

*Another process for coating metals with nylon, using finely divided nylon in a "fluidized bed" process, generally produces thicker coatings.



Spirals Without Springs

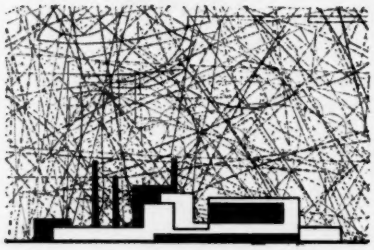
The telephone cords shown above have no metal springs inside. The coil is imparted by a vinyl jacketing material that possesses a built-in "memory."

The cords are made by extruding a vinyl polymer (Geon 81576) directly onto wire, winding the coated wire around a mandrel, then subjecting it to heat. When cooled, the cord is "set" in a coil, will revert to this form after distortion.

These cords are manufactured for Bell Telephone by Whitney Blake (New Haven, Conn.), Plastic Wire & Cable (Jewett City, Conn.), Whitaker Cable (Kansas City) and Thalo Plastics (Wooster, Mass.). Other uses: as power or control wiring on machines or equipment.

SITUATION WANTED

PLANT NEEDING HEAVY DUTY CORROSION PROTECTION



If paint is doing a satisfactory job of protecting your plant structure or equipment against chemical fumes, splash or spray, stop right here. If not, GACO Neoprene A-700 Maintenance Coating is a product you should know about. It wraps a film of tough, elastic Neoprene rubber around metal, wood, or concrete; offers the advantages of higher resistance to corrosive agents, wide temperature ranges, sunlight, weathering, surface abrasion—and at lower applied cost.

GACO

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You get a back-log of almost 20 years of experience in corrosion control among the top names in U.S. Industry when you specify GACO Neoprene Protective Coatings. And there's an entire family of GACO products and services available including field technicians, laboratory, fabrication, and lining facilities. A GACO Corrosion Specialist in your area is prepared to serve you. For complete information, write—we'll forward literature of interest.

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Wilmington 99, Delaware

Pioneer Leader In Protective Coatings

Authorized Distributors in principal cities U.S.A. Australia. Belgium. England. Finland. France. Israel. Japan. Norway. Okinawa. Philippine Islands. Puerto Rico. Sweden. In Canada: Gaco Products Ltd., Brantford, Ontario.

to any thickness desired. Formulation modifications produce coatings that dry to either flat or glossy finishes.

Rugged Reputation: Another plus of the Genton metal coating system is the durability of the coating. Expensive (at about 67¢/lb., they cost about $5.50/gal. in moderate quantity), the nylon "paints" are competitive on a use basis, according to General, because of nylon's toughness.

Nylon coatings have good resistance to most chemicals and water, good flexibility, adherence, extreme abrasion resistance. Durability is such that General feels thinner-than-conventional applications offer equivalent protection.

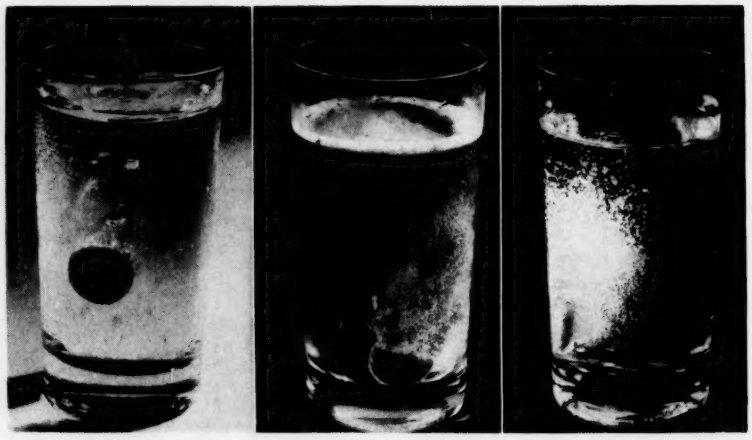
Off Limits: According to General's Paul Hess, who did much of the development work on the dispersion, Genton 110 isn't without its limitations. Based on an alcohol-soluble Zytel, the resultant product naturally lacks resistance to low-molecular-weight alcohols. (Still under development are dispersions made from the nonalcohol-soluble nylon types.)

And because nylon has been described as low in resistance to ultraviolet light degradation and to atmospheres containing oxidizing acids, Hess takes the precaution of suggesting his dispersion as a primer where these conditions are met. But his own tests indicate that nylon's shortcomings may have been overemphasized.

Until the dispersion has been fully evaluated as a coating and patents on the process are published, General will hold on to the secrets of manufacture. But, says President Bob Goldsmith, licensing isn't ruled out for the future; it will likely be tried abroad before it's tried here. Right now, he wants General to concentrate on building its own markets for the dispersion.

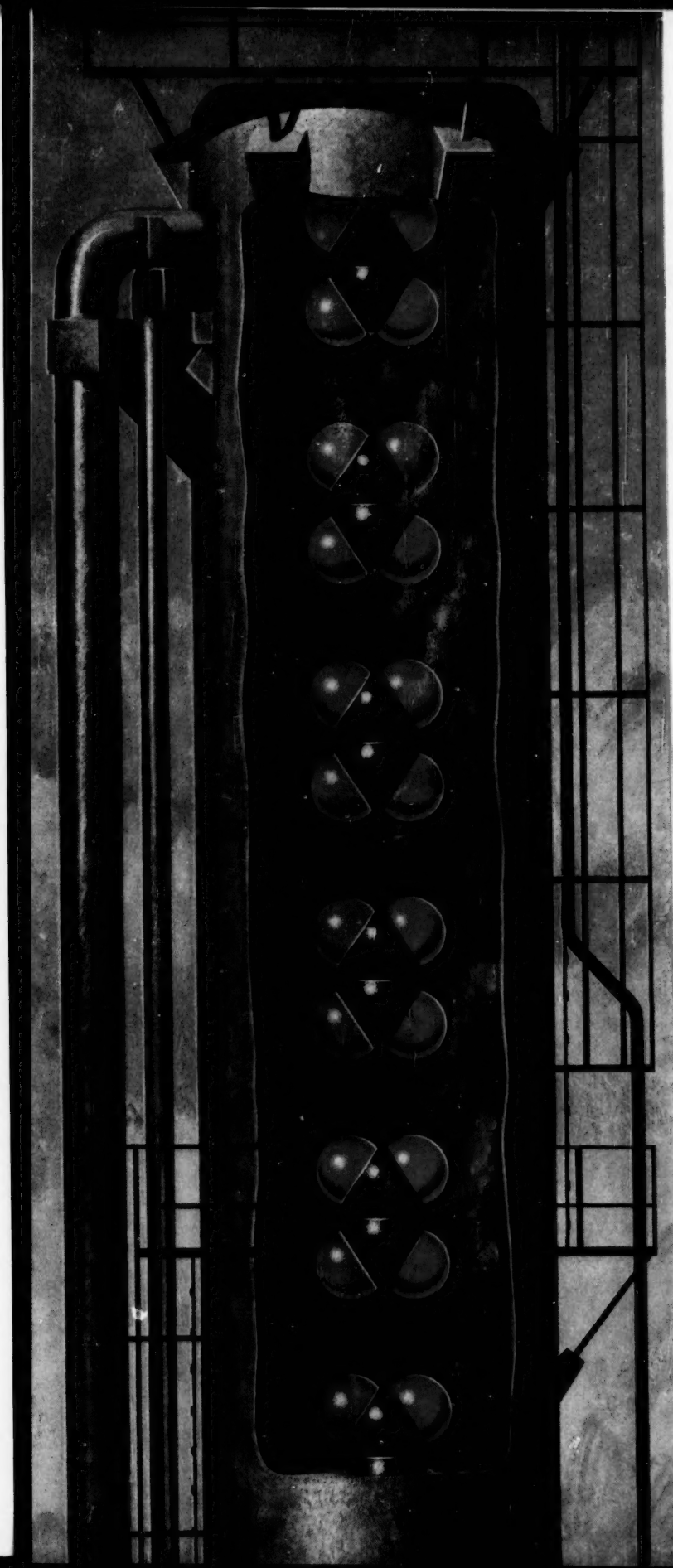
•

Good Mixer: A material designed to facilitate the field mixing of emulsifiable pesticide concentrates with liquid fertilizers is being sold by Emulsol Chemical Corp. (Chicago). The recently marketed material is especially recommended in formulating emulsifiable concentrates for high-potash fertilizer solutions. It is called Emcol H-C.



Now: Do-It-Yourself Soda Pop

Emerson Drug, a division of Warner-Lambert Pharmaceutical, is launching its first entry into the nondrug field. Now being sold in selected areas of the East and Midwest, the company's tableted soft drink, Fizzies, has managed to capture as much as 45% of the non-bottled soft drink market in test areas. The tablets are individually packaged in foil, eight tablets to a 25¢ package. Flavors available are cherry, lime, orange and grape. A small sales force plus food and drug brokers are now selling the lightly carbonated beverages. The sales force will be expanded in the near future when the company goes national with the product. Basic appeal will be to children, who enjoy the explosive action of the drop-in pop.



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HIGH QUALITY—Gulf consistently produces highest quality ethylene with exceptionally low concentrations of oxygen, carbon monoxide, acetylene, sulfur and moisture. And Gulf research assures continual upgrading.

CONTINUOUS AVAILABILITY—Gulf turns out more than a million pounds of ethylene a day . . . in *two* plants. Big volume production in two plants means a double assurance of constant supply.

UNDERGROUND STORAGE—You get added assurance of uninterrupted supply from Gulf's reserves of ethylene, stockpiled in underground cavities capable of storing more than a month's output.

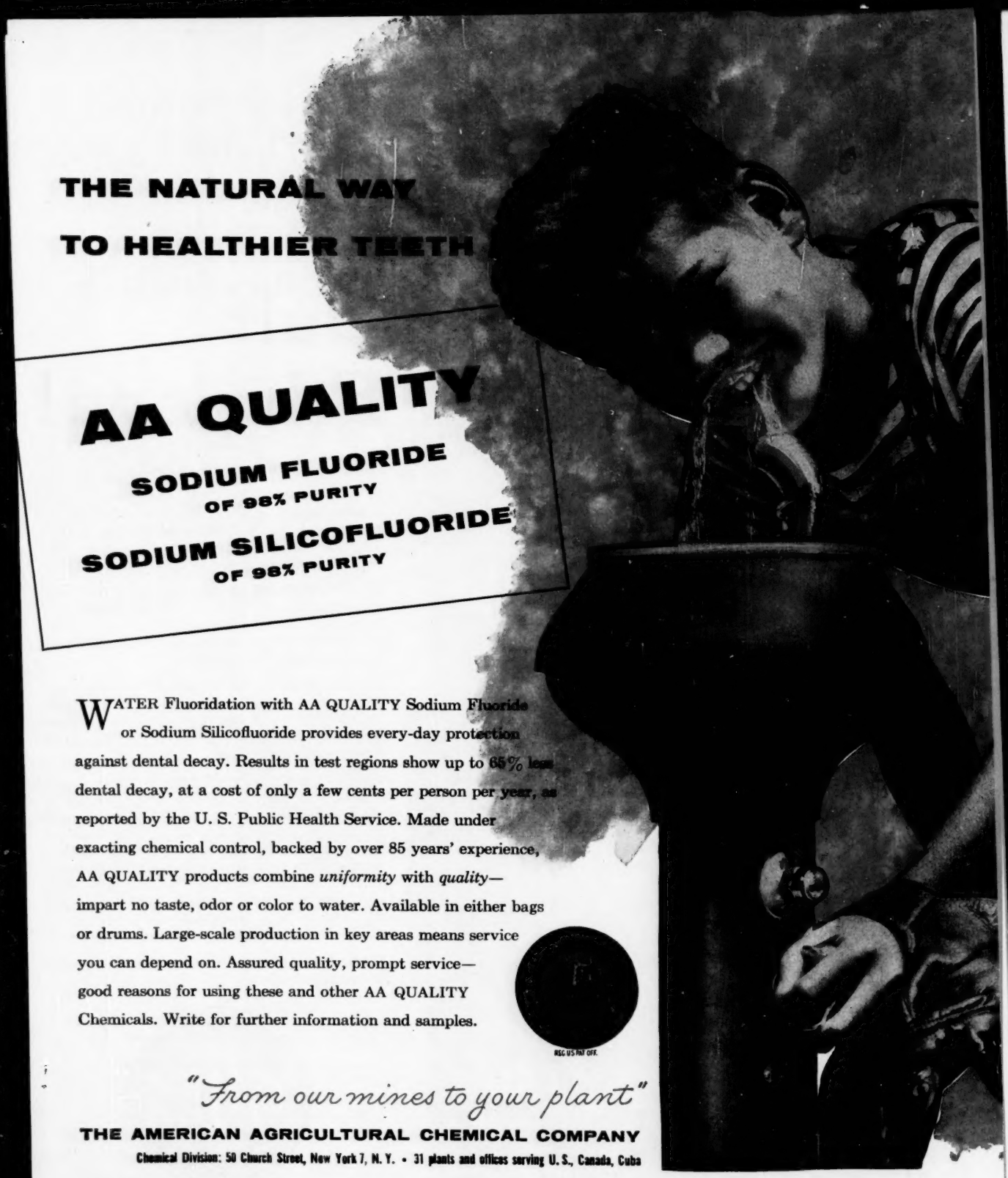
PIPELINE CONVENIENCE—You can have ethylene at your doorstep at a wide choice of plant locations on Gulf's 140-mile pipeline system which extends through the heart of Texas' chemical producing country from Port Arthur east to Orange and west to Houston and Texas City. For pilot plants and other small-requirement operations, Gulf can supply ethylene for tube truck delivery anywhere in the United States.

Let Gulf give you the whole story. Write, wire or phone.

GULF

PETROCHEMICALS DEPARTMENT
Gulf Oil Corporation, Gulf Building
Pittsburgh 30, Pennsylvania

QUALITY CHEMICALS
from PETROLEUM



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AA QUALITY

SODIUM FLUORIDE
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SODIUM SILICOFLUORIDE
OF 98% PURITY

WATER Fluoridation with AA QUALITY Sodium Fluoride or Sodium Silicofluoride provides every-day protection against dental decay. Results in test regions show up to 65% less dental decay, at a cost of only a few cents per person per year, as reported by the U. S. Public Health Service. Made under exacting chemical control, backed by over 85 years' experience, AA QUALITY products combine *uniformity* with *quality*—impart no taste, odor or color to water. Available in either bags or drums. Large-scale production in key areas means service you can depend on. Assured quality, prompt service—good reasons for using these and other AA QUALITY Chemicals. Write for further information and samples.

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THE AMERICAN AGRICULTURAL CHEMICAL COMPANY

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FLUORIDES AND SILICOFLUORIDES
Sodium Fluoride • Ammonium Silicofluoride
Magnesium Silicofluoride
Potassium Silicofluoride
Sodium Silicofluoride • Zinc Silicofluoride
Silicofluoride Mixture
Ammonium Fluoborate
Aluminum Fluoride
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KEYSTONE® Gelatin: Edible, Photographic, Pharmaceutical, Technical

OTHER PRODUCTS
Animal Bone Charcoal
Bone Black Pigment (COSMIC® Blacks)
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Sulphuric Acid • Insecticides-Fungicides

Technology
Newsletter

CHEMICAL WEEK
July 6, 1957

Ethyl Corp. has a new antiknock additive for aviation gasoline. Ethyl doesn't say much about the additive's structure except that it's an organic compound of manganese. Its experimental name: AK-33X.

In tests carried out by Ethyl and Curtiss-Wright, the new compound, used to supplement TEL, permitted power gains of up to 20% in full-scale engine tests. Ethyl says that the project is still in the research and development stage but makes clear that it is studying potential applications as a supplementary additive for motor fuels.

It doesn't say anything at all about the method of preparing the new compounds. But it undoubtedly ties in with the firm's recent work in metal alkyls (*CW Technology Newsletter, April 15*).

•

Schering Corp. now must worry about prednisone. This active synthetic hormone on which Schering's very profitable Meticorten drugs are based, has been said to have "significant limitations and serious, at times fatal, adverse side effects, and must be used with caution."

Dr. Joseph J. Bunim, of the National Institute of Arthritic and Metabolic Diseases (Bethesda, Md.), made the statement last week before a worldwide gathering of arthritis specialists in Toronto, Can. Just three years ago, Bunim had introduced prednisone as a drug very superior to cortisone, and much safer to use.

Schering, of course, is not the only firm making hormones based on prednisone or the related compound, prednisilone. But Schering's near-dominance of the field in the early days of the "meti" drugs gave it a substantial edge on the competition—and contributed mightily to its profits. Schering's profit margin is among the factors that attracted the attention of Revlon, Inc., which has bought 8.5% of the outstanding Schering stock (*see p. 25*).

•

Du Pont is introducing a new nylon this week. Tagged 420 nylon, it was designed primarily to fortify rayon and cotton. It's being made in limited quantities (less than 50,000 lbs./month), pending installation of "essential new equipment."

Important applications for it, Du Pont feels, will be in cotton work clothes and rayon suits, slacks and jackets. Tests indicate an average of at least 70% longer wear for such garments when fortified with 420 nylon, compared with articles without fortification.

•

General Electric will quadruple its polycarbonate production. Although it has never revealed anything about its present capacity, GE makes clear that the quadrupling will still keep polycarbonate in the pilot stage. Preparations for the expansion have started, but no timetable has been set for completion.

Technology Newsletter

(Continued)

The Atomic Energy Commission has declassified the first reports under its current major declassification program. In this first group: 1,063 reports, selected from 20,000 classified documents. The titles of the declassified reports are contained in Report Announcement Bulletins TID-1911 and TID-1912 (Office of Technical Services, Dept. of Commerce, Washington 25, DC).

•

More complete descriptions of the "most useful reports" will be listed in "Nuclear Science Abstracts," AEC's unclassified abstract journal. Under present plans, all documents being declassified under the new program will be announced by August.

•

A mammoth $168-196-million nuclear power station may be built in Great Britain. The Ministry of Power has given formal consent to construction of the station at Hinkley Point in Somerset, southwest England. And the builders (English Electric, Babcock and Wilcox, and Taylor Woodrow) are submitting their plans.

The Central Electricity Authority will complete consideration of plans in August. If it accepts one, work on the station will begin in September. Operation is scheduled for late '59 or early '60.

The biggest station planned for the country so far, it will have two nuclear furnaces, each rated at 250 megawatts.

•

Pfizer has obtained rights to the French polio vaccine. With its license from the Pasteur Institute, it can make and sell the vaccine throughout the world—except in Iron Curtain countries or where there is a Pasteur Institute.

The French vaccine was developed by Professor Pierre Lepie of the institute several months after the Salk vaccine was introduced here. According to Jacques Trefouel, director of the institute, it has proved successful in all cases, has been 100% safe.

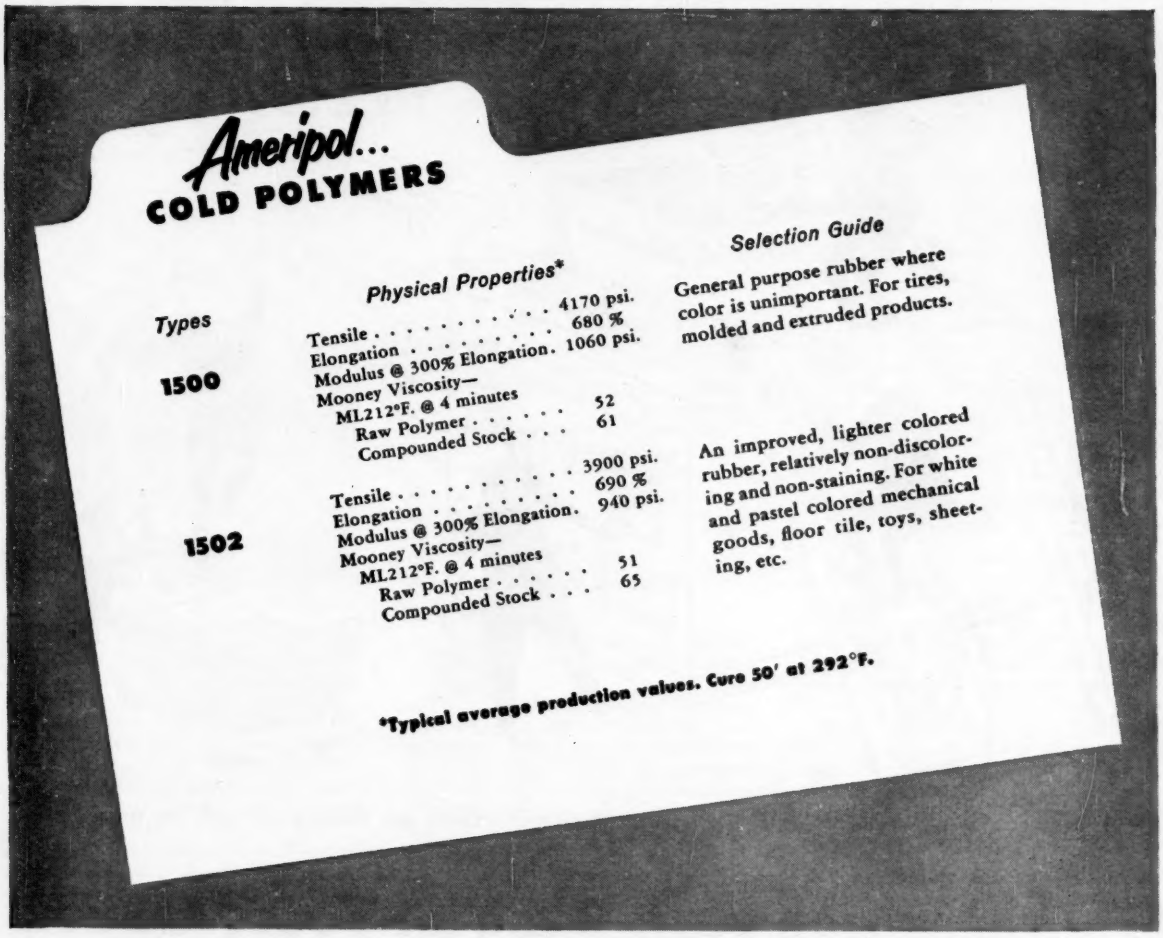
•

A new recording system applicable to process instrumentation, computers, radar and air traffic control was revealed this week by Sylvania Electric Products. Heart of the Sylvatron system: flat glass electro-luminescent panels with various photoconductive and electroconductive surfaces that give the panels these properties:

- To manipulate electrically the position of a mobile dot on the luminescent panel.
- To reproduce optically the track of such a spot of light, and to store such an image indefinitely in visible form.
- To reproduce optically a motion picture with good resolution and rapid response.

As yet, even Sylvania isn't sure how wide are the applications of the system. But right now, the firm is concentrating on applications related to national defense and to a few commercial fields. The Sylvatron panels, thus far, have been produced in 2-in. and 4-in. squares.

Goodrich-Gulf Chemicals, Inc.


Ameripol...
COLD POLYMERS
Physical Properties*
Selection Guide
Types
1500
Tensile . . . . . 4170 psi.
Elongation . . . . . 680 %
Modulus @ 300% Elongation. 1060 psi.
Mooney Viscosity—
ML212°F. @ 4 minutes
Raw Polymer 52
Compounded Stock . . . 61
General purpose rubber where color is unimportant. For tires, molded and extruded products.
1502
Tensile . . . . . 3900 psi.
Elongation . . . . . 690 %
Modulus @ 300% Elongation. 940 psi.
Mooney Viscosity—
ML212°F. @ 4 minutes
Raw Polymer 51
Compounded Stock . . . 65
An improved, lighter colored rubber, relatively non-discoloring and non-staining. For white and pastel colored mechanical goods, floor tile, toys, sheeting, etc.
*Typical average production values. Cure 50' at 292°F.

Choose cold polymer man-made rubber for superior flexing, wear, abrasion resistance

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3121 Euclid Avenue • Cleveland 15, Ohio

How many sales per advertising dollar? Operations researchers are coming up with the answers.

From Research, More Bang for Your Ad Buck

Operations researchers at Arthur D. Little's Cambridge headquarters are getting results that promise to topple several sturdy axioms of advertising.

Item: Experiments show that the first dollars spent in a campaign are the most effective in producing sales. That's contrary to the "threshold" concept, which holds that a certain sum must be expended before any significant results occur.

Item: Promotion is much more effective in attracting new customers than in retaining old customers.

Item: Individual campaigns have a "saturation level," a point beyond which additional promotion of the same type fails to generate extra sales.

Item: Campaign pretesting is readily feasible, gives reliable and reproducible results and data for estimating the return on ad expenditures.

ADL would be among the first to say that its findings are tentative, need much broader corroboration before there could be wholesale application to all industries; the studies covered only some 100 products, some six companies. And many of the products tested were consumer-type chemicals. No attempt has been made to weigh copy and art pitches. Still, the researchers are quietly confident that their work will prove applicable, in some respects even to industrial promotion.

Why? Because both pretesting and the actual campaign appear to follow a simple differential equation. It relates sales volume (S), the rate of advertising expenditure (A), the rate of sales decline or "decay" (L), the saturation level or maximum attainable sales in a given campaign (M), and a measure of the sales attributable to advertising (the response constant, r) into a single formula:

$$\frac{dS}{dt} = rA \cdot \frac{M - S}{M} - LS$$

Constant Decay: In its work with the equation, ADL has repeatedly observed that in the absence of any promotion, sales of a specific product decay at a constant percentage each year. The rate can vary enormously, be as little as 1 to 2% for a product with little competition or as much as 50% for a highly fashionable product (e.g., lipstick). A good average: 5 to 10%. Though the sales decline rate may vary by the industry and the type of customer reached, it's mainly determined by the product and by very little else.

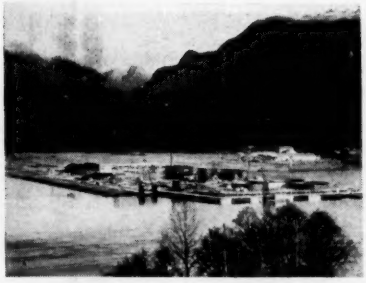
When promotion starts, sales decay still takes place and is represented by the number of customers lost each

BRIEFS for buyers of

Caustic Soda

Phosphorus Compounds

Other Chemicals



Chemicals for a growth area

Pulp, petroleum, and plywood are three of the main reasons why industry is popping in western Canada.

Fitting neatly into this growth picture is the new plant of Hooker Chemicals, Ltd., in North Vancouver, B.C. The plant, which opens this summer, is Canada's first chlor-alkali producing point west of the Rockies.

By rail and barge, it will supply caustic soda and chlorine for making and bleaching pulp; more caustic soda to help sweeten petroleum refinery products and to produce plywood adhesives.

Hooker customers around Vancouver will enjoy a freight saving on these chemicals, which formerly came into the area by sea-going barge from our Tacoma plant.

Is your supplier growing with you?

In its modest way, this new Hooker plant underscores a point that you may consider important in your own expansion plans.

You have much to gain by tying up with a chemical supplier geared to the spread of industry into new areas; accustomed to anticipating your requirements of tomorrow, even while serving you dependably today.

Close to the major industrial centers of the East, Midwest, and West Coast, Hooker plants and stock points give you quick, dependable service when you need it. All Hooker caustic soda plants and distributing points are on deep water. This makes transportation extremely flexible. It tends to minimize shipping costs, and permits a choice that can make a big difference if an emergency occurs.

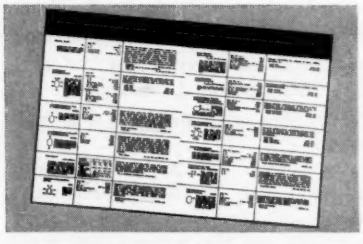
And if you buy l/c/l, there's an authorized Hooker distributor nearby, ready to meet your needs for caustic soda and other Hooker chemicals.

If you'd like to see how this flexible, fast-moving supply team can strengthen your position on chemicals, drop us a line and we'll get the facts to you promptly.

New bulletin lists Hooker products

You'll find a complete up-to-the-minute listing of Hooker chemicals in this new 12-page bulletin.

The new bulletin supersedes General Products List 100 and Bulletin 100-A which you may have now. Indexed for ready reference, it lists the chemicals you can buy from us in commercial quantity, including chemicals sold under the NIALK® and OLDBURY® brand names.



Under each product you'll find a short description and condensed listing of properties, actual and suggested uses, and shipping containers. The bulletin also sums up for you the major types of processing performed at Hooker.

If you'd like to have this up-to-date timesaver in your file or on your desk, just check the coupon for a copy of *Bulletin 100-A*.

Here's data on phosphorus-sulfur compounds

Every time you strike a match, you're helping to justify the market researchers' predictions for one of our OLDBURY Products: red phosphorus.

This fascinating element got off to a commercial start in this country in 1910, on the site of the present OLDBURY Products plant in Niagara Falls.

Today many other items that must burn up before they can do anyone any good are made with OLDBURY *red phosphorus* or *phosphorus sesquisulfide*, P_4S_3. These include matches, fireworks, safety and signal flares, fusees, and smoke screens.

Your product may require another equally useful, though less dramatic, way of putting phosphorus to work:

Phosphorus Pentasulfide, P_4S_{10}. We make it in three particle-size grades of powder, and as a fused solid. Phosphorus content is 27.8% minimum. Powder forms come in lever-pak drums, 150 lbs. net; solid in single-trip steel drums, 215 lbs. net.

These products are available, as always, under the highly reputed OLDBURY label. For more information, we suggest you check the coupon for new technical data sheets just completed.

For more information on chemicals mentioned on this page, check here:

- ☐ Caustic Soda
- ☐ New list of products—Bulletin 100-A
- ☐ Phosphorus, white
- ☐ Phosphorus, red
- ☐ Phosphorus Pentasulfide
- ☐ Phosphorus Sesquisulfide

Clip and mail to us with your name, title, company address. *(When requesting samples, please use business letterhead.)*

HOOKER ELECTROCHEMICAL COMPANY
707-1 FORTY-SEVENTH STREET, NIAGARA FALLS, N. Y.

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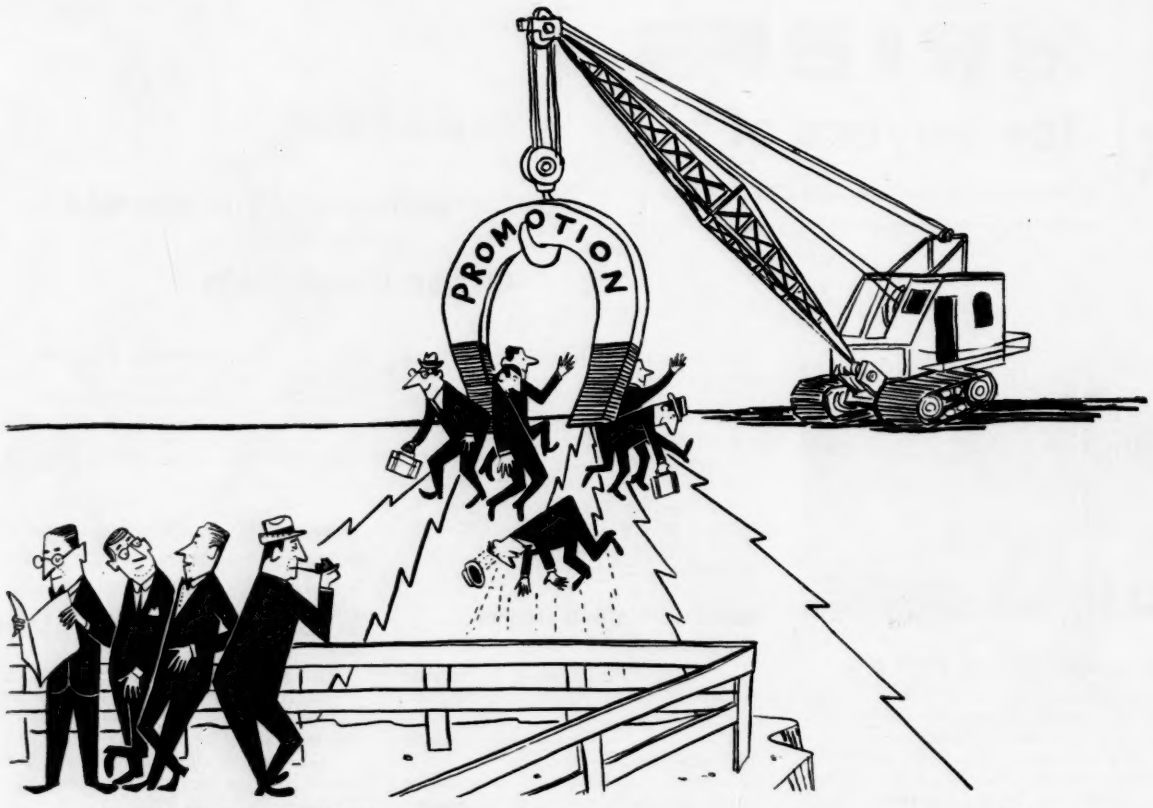
HOOKER CHEMICALS PLASTICS



SELECTIVE ATTRACTION: Consumer ads influence new customers more than old.

year. But because more customers are being gained (by the advertising) than are lost, total sales volume increases. The sales decay constant (L), says ADL, appears independent of the gain in new customers.

Results indicate that the rate of customer loss isn't normally changed by advertising; hence, advertising is relatively ineffective in holding customers. Promotion is most profitably beamed at acquiring new business.

Quick Jump: It's been ADL's experience that sales mount steeply in the initial phase of a promotional drive. Then, despite continuing advertising effort, sales volume reaches a maximum (the saturation level), remains at that plateau for a while and subsequently slides off at the usual decay rate. The data indicates that each product has its characteristic saturation level, and that the level varies with the type of promotion and media.

That means that a completely new campaign or a shift to other media (e.g., from TV to newspapers) can boost sales to a new saturation level by tapping unreached potential customers. The new campaign, explain Little's researchers, must be "greatly different." And, since the first campaign chosen usually has the most available potential customers, it's likely to have the highest saturation level.

Obviously, ADL's curves showing a rapid rise in sales volume at a campaign's onset constitute a sharp challenge to the theory that initial advertising is ineffective. But more significant are these implications:

- Because promotion is ineffective after the saturation level is attained, many an ad drive may be too long.
- Money wasted in long campaigns may be more profitably diverted to other campaigns or to other products.

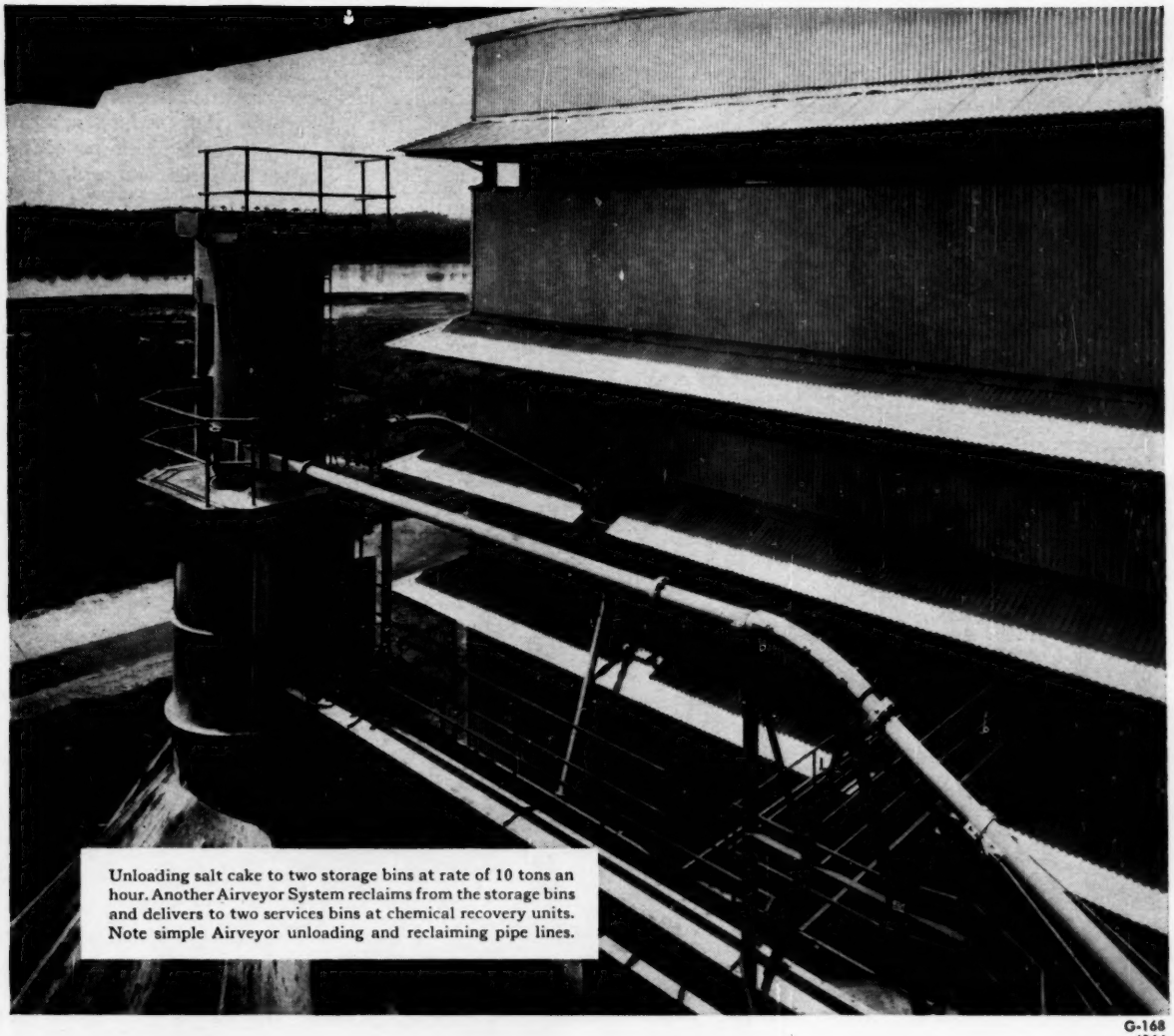
Effective Dollar: Technically, ADL describes the response constant as "the increased rate of sale that is stimulated by an effective dollar of advertising." The constant explains why the sales curve flattens during the ad campaign, why only part of the ad budget bags new potential customers. Only a given number of people are candidates for conversion. But as the ad drive wins new customers, the number available for conversion diminishes. At the saturation level, no more potential customers exist, no more dollars can be effective.

Reliability: ADL claims its equation "satisfactorily describes" the promotional activity analyzed. Data collected in pretests (to evaluate the equation's parameters) has accurately forecast the results of subsequent campaigns. And the formula has given reliable insight into these areas:

- Effort needed to keep sales at a given level.
- Length of campaign required to maximize return on ad investment.
- Products most suitable for promotion.
- The approximate size of the optimum advertising budget.

Moreover, the formula and field tests suggest that some products are inherently unresponsive to promotion. But ADL isn't yet prepared to say what characterizes the "unresponsive" product.

Limitations: Although the formula



Unloading salt cake to two storage bins at rate of 10 tons an hour. Another Airveyor System reclaims from the storage bins and delivers to two services bins at chemical recovery units. Note simple Airveyor unloading and reclaiming pipe lines.

G-168
4364

CHEMISTRY...A DYNAMIC FACTOR IN CREATING NEW INDUSTRIES

It would be difficult to name any product that is manufactured or processed without chemicals. Here is an industry that affects every facet of our lives—our health, our comfort, our living standards, our defense... today and in the future.

Thousands of plants throughout the country are producing millions of tons of chemicals annually. To keep this production at a high level, many companies have turned to Fuller *pneumatic* conveying systems for handling dry bulk materials. Fuller Airveyor,® Airslide,® Fuller-Kinyon Conveying Systems, and Fuller Rotary Compressors and Vacuum Pumps are maintaining their high production level.

Chemical plants* in the United States and in many foreign countries employ one or more of the basic Fuller Systems. The reasons include proved dependability for sustained production with minimum maintenance, elimination of dust (systems fully enclosed), minimum space requirements, flexibility of application, and ease of automation.

Fuller offers you more than 30 years of specialized experience—ready to work for you—ready to provide the right answers to your problems. Write today for detailed information on Fuller Systems.

*Names on request.

FULLER COMPANY GENERAL AMERICAN TRANSPORTATION CORPORATION TRADE MARK

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pioneers in harnessing AIR

FULLER COMPANY
141 Bridge St., Catasauqua, Pa.
SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION
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BIO-CHEMICAL DEPARTMENT
THE ARMOUR LABORATORIES
P.O. Box 511, Kankakee, Illinois

has stood up in the cases studied so far, it may not hold when fundamental or earth-shaking changes take place in the market. Such changes, says the ADL team, pop up very infrequently.

The formula's applicability to industrial products remains yet undetermined.

Little's group, too, has yet to probe institutional advertising. Changes sought by institutional promotion (such as increased public awareness of the company) often require years to achieve. The same holds for promoting reputation for quality, fast delivery or service. Over a long period of time, the characteristics of the market may change appreciably and destroy the validity of the tests. That's why ADL has confined its efforts (to date) to product advertising only, where results show up promptly.

Additional work may or may not bear out ADL's results. Come what may, it's certain to stimulate more research, provoke more doubts about advertising "rules of thumb."

New polyethylene inserts mean bigger payload for fiber drums.

Lightweight Grooms for Heavy Work

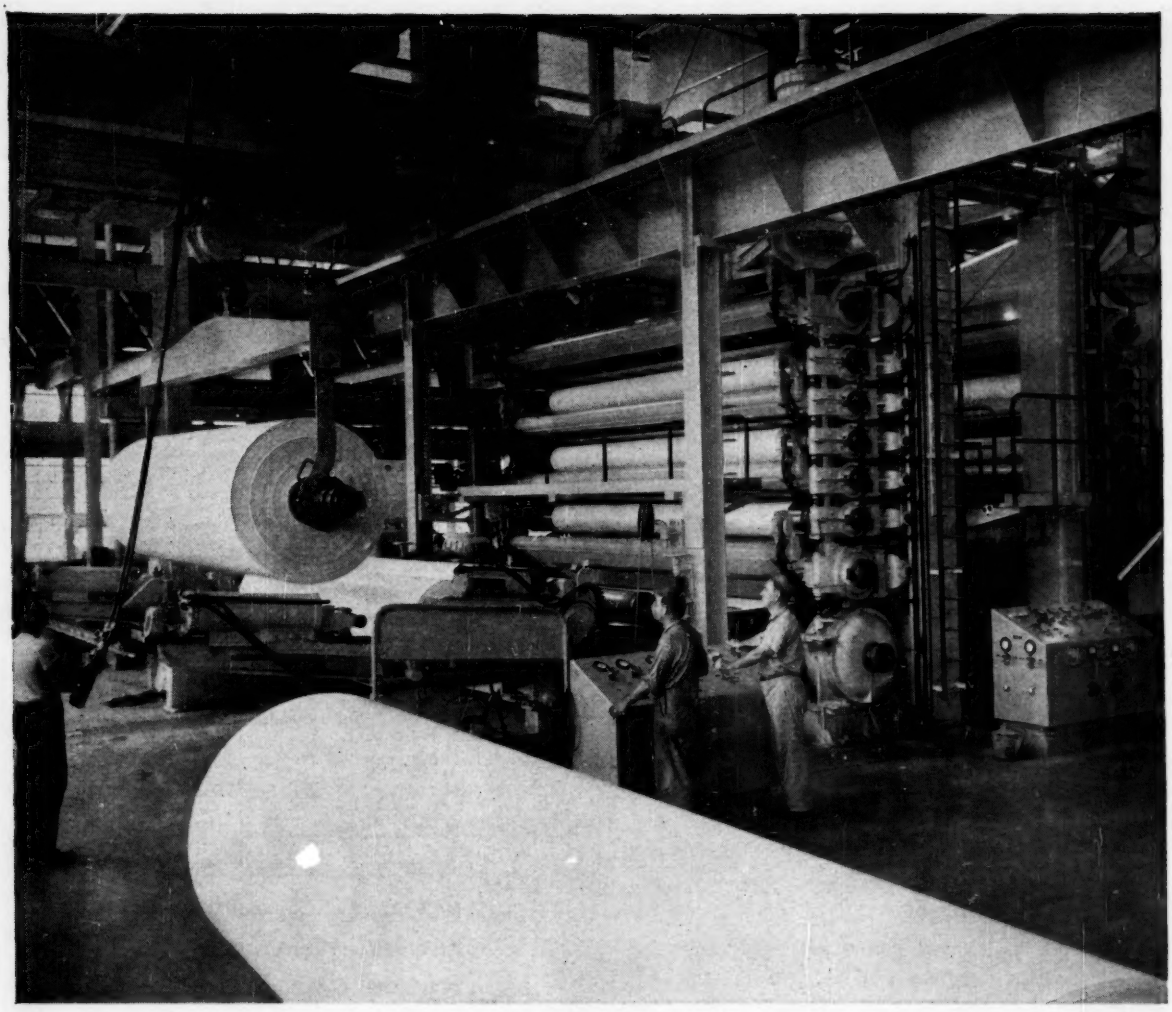
New developments in polyethylene inserts may make fiber drums suitable for shipping heavy quantities of corrosive chemicals. Delaware Barrel and Drum Co. has just received tentative okay from the Interstate Commerce Commission on a new, thin-gauge, lightweight nonreturnable polyethylene drum that so far is the largest authorized for corrosive chemicals moving in fiber drums. Some 14 drum closures also have been worked out.

In the 55-gal. version, the drum has been approved for use in fiber drum overpacks at weights up to 840 lbs.; the previous limit was about 400 lbs. Motor and rail carrier groups have also okayed the unit.

Delaware's entry fits the standard 55-gal. drum, has a minimum wall thickness of 0.030 in. (The regular polyethylene drum, ICC Type 2S, is 0.125 in. thick.) Test shipments indicate that the drum is suitable for mineral acids, syrup, cleaners, alkalis and many other fluids and pastes.

Right now, the insert and fiber drum costs a bit more than the standard metal drum. But the new boost in steel prices, say Delaware spokesmen, will make the combination highly competitive. The drum is billed as "nonreturnable" and may be reused.

Delaware will eventually offer the insert drum in other sizes of 5, 15 and 30 gal.



GOOD PRINTING STARTS HERE—Hercules CMC applied at the wet stack from one or two boxes results in bleached kraft board that provides higher and more uniform gloss printing.

Hercules® CMC In The Mill Means Better Gloss Printing On The Press

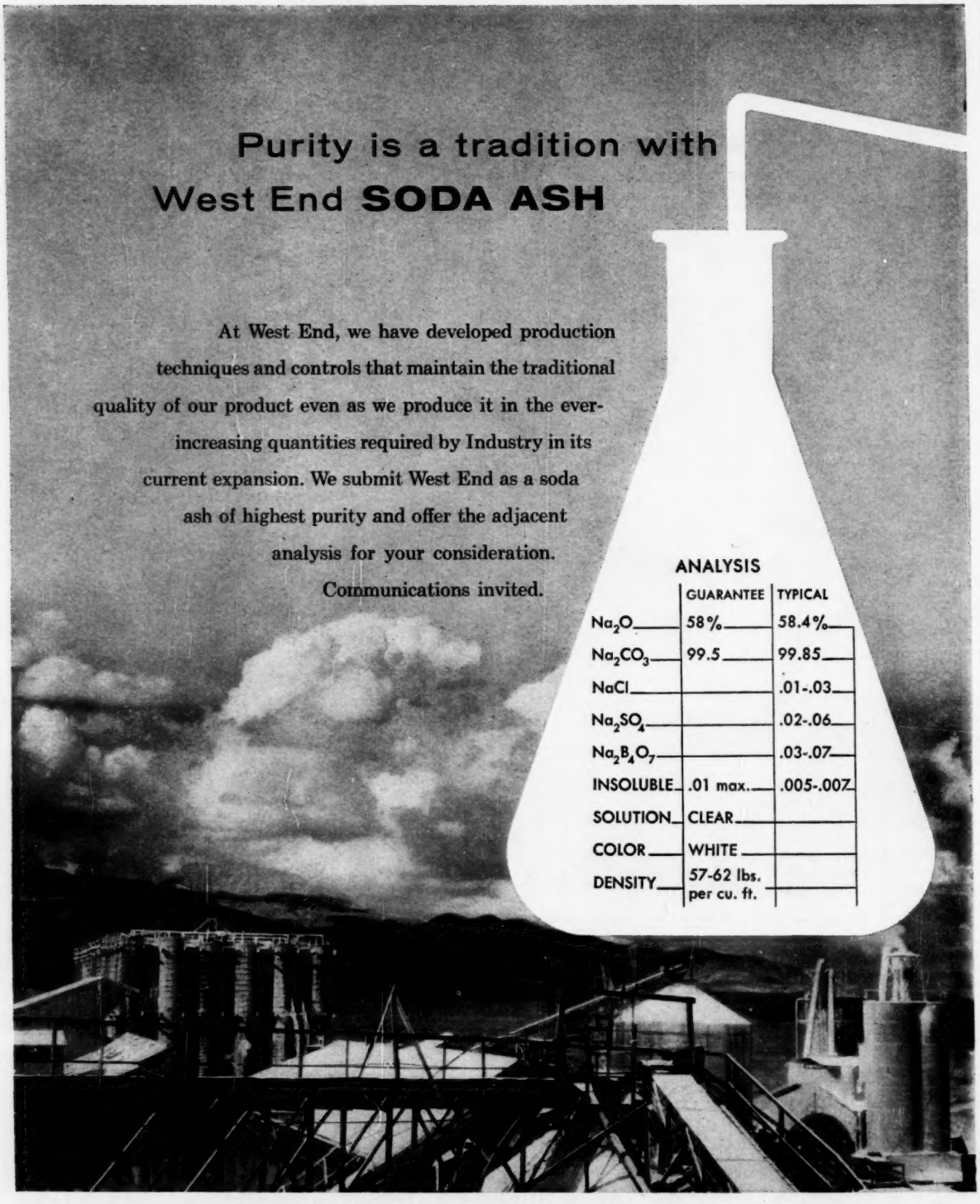
Properly applied to paperboard, CMC decreases ink penetration and achieves high ink gloss economically. That's why for such uses as cigarette and frozen food packaging or cup stock, many mills apply CMC.

Paperboard sized with CMC provides higher Vanceometer for increased ink mileage and less fuzz for improved finish. And CMC is easy to apply. We'll be glad to send you additional information on Hercules CMC and its use in the paperboard industry.

HERCULES
cmc

Virginia Cellulose Department
HERCULES POWDER COMPANY
INCORPORATED
900 Market Street, Wilmington 99, Delaware

VP57-1


Purity is a tradition with
West End SODA ASH
At West End, we have developed production techniques and controls that maintain the traditional quality of our product even as we produce it in the ever-increasing quantities required by Industry in its current expansion. We submit West End as a soda ash of highest purity and offer the adjacent analysis for your consideration. Communications invited.
ANALYSIS
GUARANTEE
TYPICAL
Na_2O 58% 58.4%
Na_2CO_3 99.5 99.85
NaCl .01-.03
Na_2SO_4 .02-.06
$Na_2B_4O_7$ .03-.07
INSOLUBLE .01 max. .005-.007
SOLUTION CLEAR
COLOR WHITE
DENSITY 57-62 lbs. per cu. ft.

WEST END

West End Chemical Company

DIVISION OF STAUFFER CHEMICAL COMPANY

EXECUTIVE OFFICES, 1956 WEBSTER, OAKLAND 12, CALIF. • PLANT, WESTEND, CALIF.

SODA ASH • BORAX • SODIUM SULFATE • SALT CAKE • HYDRATED LIME

Market Newsletter

CHEMICAL WEEK
July 6, 1957

Several new nitrogen and synthetic rubber plants started production this week.

Among the former is Phillips Pacific Chemical's $15-million Coulee ammonia plant near Kennewick, Wash. It's owned jointly by Phillips Petroleum and Pacific Northwest Pipeline.

Completed in May, the plant is now turning out anhydrous ammonia (at a 200-tons/day clip) and aqua ammonia. Natural gas is raw material used to make the fertilizer product.

Another nitrogen products plant was formally opened last week by U.S. Steel. The installation, located at the firm's Geneva Works near Provo, Utah, utilizes several Montecatini processes to make anhydrous ammonia and other nitrogen products from hydrogen produced by the firm's nearby coke ovens.

The anhydrous ammonia (which contains 82% nitrogen) is aimed primarily at fertilizer use. However, some of the ammonia will be converted into nitric acid, which will be used to extract rare metals and to make ammonium nitrate, a high-analysis (33.5% nitrogen content) fertilizer product.

Incidentally, U.S. Steel's existing coal chemical recovery plant, that has been operating at the Geneva Works for the past 13 years, produces ammonium sulfate, another high-strength fertilizer.

Urea production is now under way at Spencer Chemical's Vicksburg, Miss., works. Output of the relatively small 10,000-tons/year-capacity plant (*CW, June 22, p. 86*) will be used to formulate nitrogen solutions for distribution to makers of mixed fertilizers.

Spencer's urea production does not, incidentally, imply an increase of raw material capacity. Both ammonia and carbon dioxide are available from the firm's existing facilities at Vicksburg.

•

A major expansion of synthetic rubber facilities has been completed at American Synthetic Rubber's Louisville, Ky., plant. The expansion—which cost $3.5 million—boosts the firm's synthetic rubber capacity from the former 44,000 long tons/year to approximately 69,000 tons/year.

Another elastomer will go into production early this month at Du Pont's new 15-million-lbs./year Beaumont, Tex., plant. The elastomer —a chlorosulfonated polyethylene synthetic rubber tradenamed Hypalon— has heretofore been produced on a limited scale at the firm's Belle Works near Charleston, W. Va.

Properties of Du Pont's vulcanizable rubber are said to differ considerably from those of other commercially available elastomers; for example, an outstanding advantage claimed for the material is its resistance to the destructive action of ozone.

Coincident with startup of its new rubber plant, Du Pont announces a forthcoming price reduction for Hypalon synthetic rubber.

Effective July 26, the polyethylene-derived elastomer will sell for 70¢/lb., f.o.b. Beaumont, Tex. (15¢/lb. less than the current price). Typical uses for the material: protective coatings for wood, metal, rubber fabrics; tank linings and acid hose; white-wall tires, conveyor belts.

Scheduled to go onstream in mid-July is Odessa Butadiene's 50,000-tons/year, $20-million butadiene plant at Odessa, Tex.

The installation will become the first new integrated operation unit, since World War II, to make synthetic rubber from butane at a single location. Major process units of the new plant include a field butane section, a 50,000-tons/year dehydrogenation unit, an absorption and fractionation section and a butadiene recovery unit.

•

A new pesticide plant just onstream is Allied's General Chemical Division's new Cleveland, Miss., insecticide works. The plant—known as the Delta Works—will formulate liquid pesticides for use on cotton and "all types" of cotton dusts utilizing combinations of DDT, BHC, calcium arsenate, aldrin, dieldrin, endrin, ethyl and methyl parathion, malathion and toxaphene.

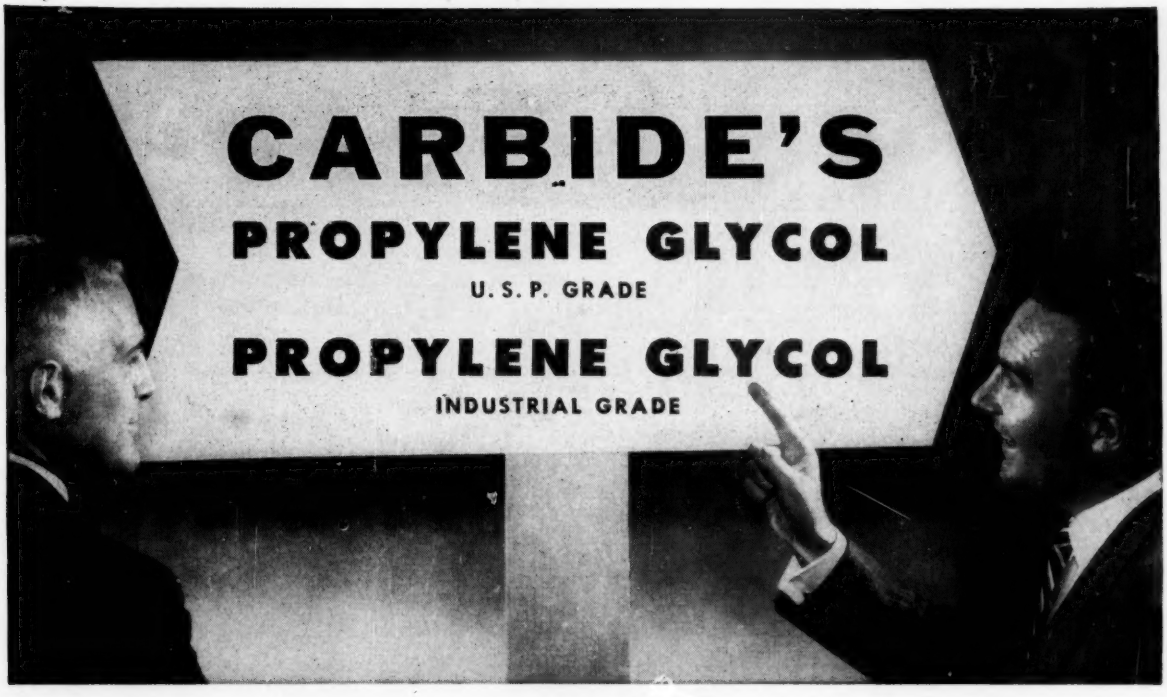
•

And in the metals field, a $4-million uranium processing mill at Jeffrey City, Wyo., will be dedicated July 30 by Western Nuclear. The 450-tons/day mill will, however, be in operation several weeks prior to formal opening.

SELECTED PRICE CHANGES — WEEK ENDING JULY 1, 1957

	Change	New Price
UP		
Acetone, CP, dms., c.l., dlvd.	$0.005	$0.11
n-Butyl alcohol, synthetic, dms., c.l., dlvd.	0.005	0.17
Vinyl acetate monomer, Zone 1, 55-gal. dms., c.l., dlvd.	0.01	0.20
DOWN		
Copper carbonate, 55%, bgs., c.l., wks.	$0.0125	$0.3275
Copper chloride, cupric, anhyd., dms., wks.	0.0125	0.4225
Copper nitrate, tech., cryst., dms., wks.	0.0075	0.2925
Copper oxide, black, bbls., 100-1,999-lb. lots, wks.	0.03	0.47

All prices per pound unless quantity is stated.



You're looking in the right direction

Propylene glycol U.S.P.—a glycol with proven high purity—has the excellent properties demanded by industry for pharmaceuticals, dyes, food flavors, and certain perfumes. Propylene glycol also assists in the dispersion of soaps, oils, waxes, and greases in water.

When used in cosmetic and brushless shaving creams, for example, propylene glycol enhances the softening and cleansing action on the skin and is a mild humectant for the cream. In brushless shaving creams, it aids in coupling the oils and lanolin in water.

CARBIDE also produces an industrial grade of propylene glycol that is widely used as a component of polyester resins, a coupler in hydraulic brake fluids, and as a coolant in refrigeration systems.

Union Carbide Chemicals Company, producer of propylene glycol since 1931, produces thirteen other diols and triols:

- *Ethylene glycol*
- *Diethylene glycol*
- *Triethylene glycol*
- *Dipropylene glycol*
- KROMFAX *Solvent* (*Thiodiglycol*)
- *2-Ethyl-2-Butyl 1,3-Propanediol*
- *2,2-Diethyl 1,3-Propanediol*
- *Hexylene Glycol*
- *3-Methyl 1, 5-Pentanediol*
- *1,2,6-Hexanetriol*
- *2-Ethyl 1,3-Hexanediol*
- *1,5-Pentanediol*

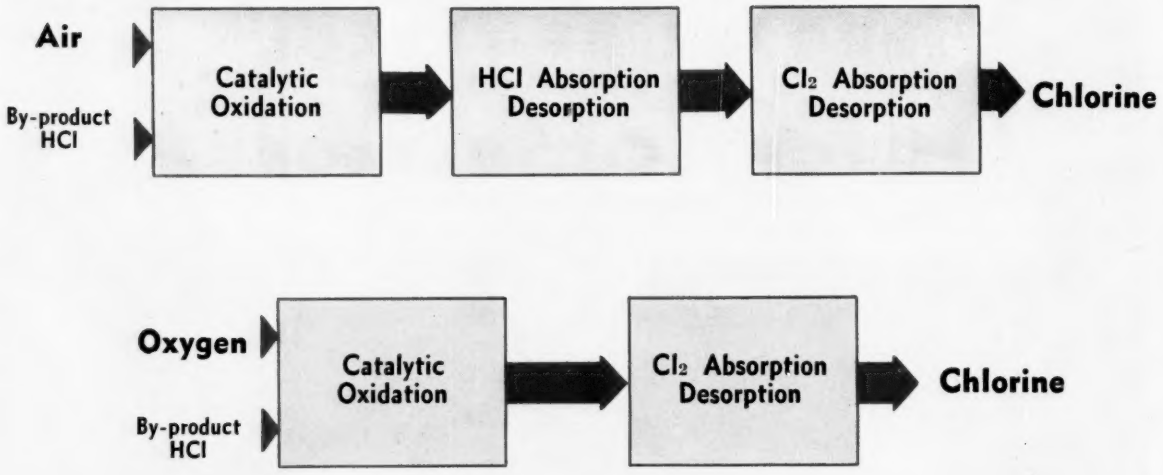
For further information on propylene glycol or any CARBIDE chemical, write for your copy of "Physical Properties of Synthetic Organic Chemicals" (F-6136) or the "Glycols" booklet (F-4763). Offices in principal cities—in Canada: Carbide Chemicals Company, Division of Union Carbide Canada Limited, Montreal.

The term "Kromfax" is a registered trade-mark of Union Carbide Corporation.

UNION CARBIDE
CHEMICALS

Union Carbide Chemicals Company
Division of Union Carbide Corporation
30 East 42nd Street, New York 17, N. Y.

Two Classic Routes to Chlorine from By-product HCl



Plus Four Improvements Added by Airco . . .

- **New catalyst**
- **New reactor design**
- **New materials of construction**
- **Efficient, low-cost absorption-desorption systems**

Chlorine Without Caustic: Economic Now?

AFTER more than 70 years on the sidelines of the chemical process industries, the Deacon process of making chlorine from hydrogen chloride is getting ready for another try at a commercial comeback. Technical Enterprises, Inc. (New York), is now offering two versions—one using air; the other, oxygen—boasting new catalysts and improved reactor design, perfected and piloted by Air Reduction Co.*

Despite its long disuse, the Deacon process hasn't been totally ignored by chlorine producers. It comes up almost every time there is a shortage of chlorine. Many companies have worked up modifications in the past two decades (*Chemical Industries, Sept. '48, p. 371; April '50, p. 501*). And with the growth of organic chlorination processes that yield one mole of HCl for every mole of chlorinated product, it has been considered seriously as an economic means of recovering needed chlorine from abundant—and often hard to dispose of—by-product HCl.

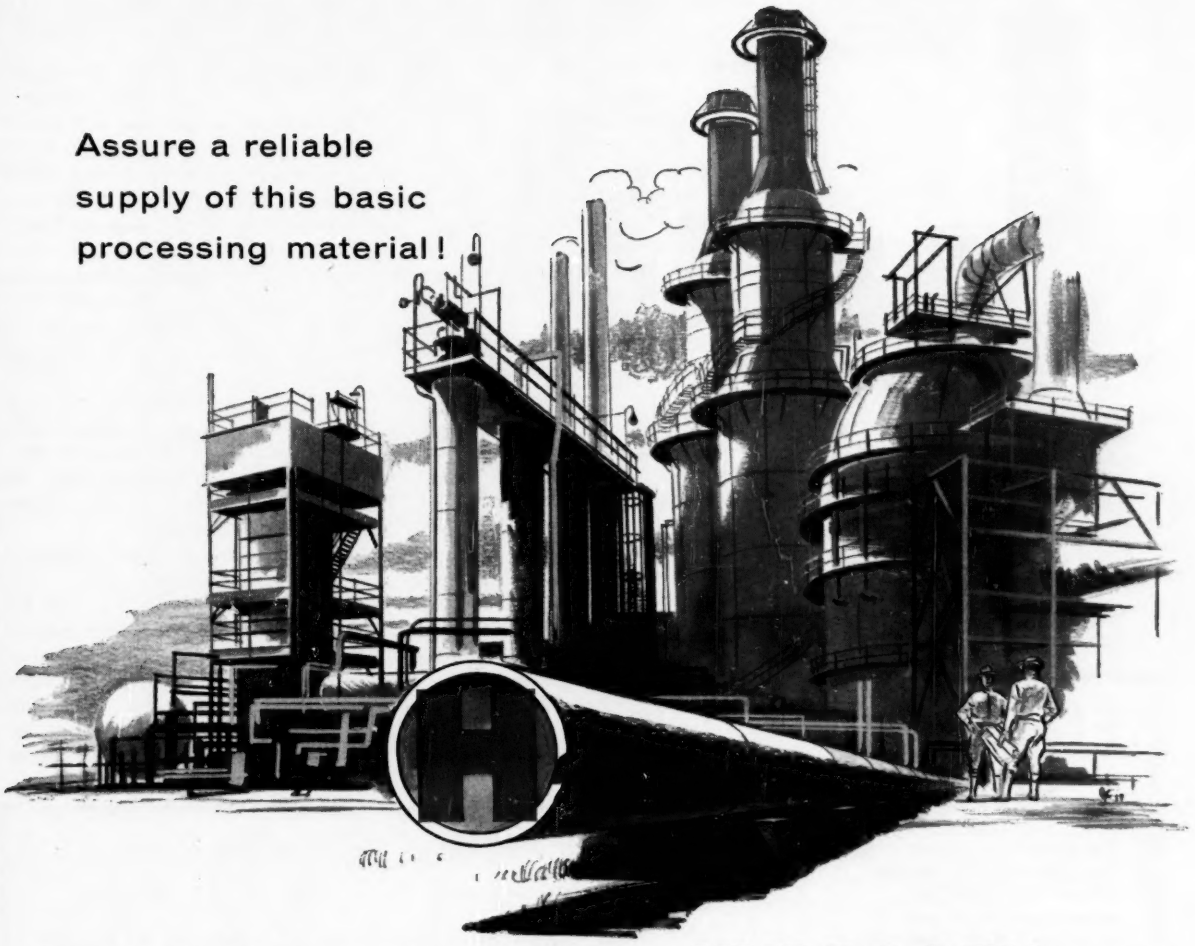
*By agreement with Airco, Technical Enterprises has completely taken over the commercial exploitation of the Airco chlorine-from-HCl process.

The most recent attempt to commercialize the Deacon process on a large scale was the installation that Hercules built in '52 at its Brunswick plant. Licensed under patents held by Dow Chemical (U.S. 2,577,808) and by Grosvenor Laboratories (U.S. 2,206,399), the Hercules plant was designed to produce about 35 tons/day of chlorine from HCl by-product of the company's toxaphene plant (*CW, Jan. 19, '52, p. 48*).

The Grosvenor-Miller process modification employed at Brunswick utilized a two-step reaction to circumvent the difficulties inherent in the direct oxidation of HCl gas with air. In the first, HCl was reacted at 425 C with ferric oxide containing potassium chloride to suppress volatilization of the resulting ferric chloride. In the second step, air oxidation of the ferric chloride at 500 C produced chlorine gas in 90% concentration, regenerated the ferric oxide.

Hercules' interest in the process was based on obvious economic advantages peculiar to the Brunswick site. It was remote from suppliers of chlorine required for toxaphene production; it had no captive use or ready

Assure a reliable supply of this basic processing material!



Consult the leader for your HYDROGEN plant

Most of the hydrogen plant capacity installed during the last ten years in the U.S.A. and Canada has been built by Girdler. So . . . to get top experience in hydrogen facilities . . . to assure utmost reliability of supply of this basic process material . . . call in Girdler when you start to plan.

There is a Girdler hydrogen plant for every need . . . any capacity . . . any hydrogen purity. Call or write for complete information.

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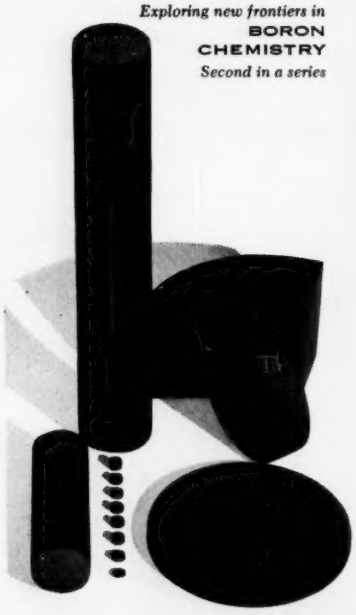
In Canada: Girdler Corporation of Canada, Ltd., Toronto, Ontario

Exploring new frontiers in
BORON
CHEMISTRY
Second in a series



BORON SHAPES for control rods and shielding in nuclear reactors, supplied through our National Northern Division, West Hanover, Mass.

ELEMENTAL BORON

To meet your growing requirements, TRONA* offers a versatile selection of these standard and special grades...

STANDARD 90-92% AMORPHOUS	SPECIAL HMG HIGH MAGNESIUM
SPECIAL MGR MAGNESIUM REACTIVE	SPECIAL NAR SODIUM REACTIVE
HPA 95-97% HIGH PURITY AMORPHOUS	

The selectivity available to you with Trona Elemental Boron is the natural result of AP&CC's long pioneering leadership in Boron Chemistry. If you're concerned with the many new development possibilities of Elemental Boron – its Ordnance uses, high temperature applications or nuclear aspects – we suggest you call your nearest Trona representative, or write

MARKET DEVELOPMENT DEPARTMENT

TRONA

*TRADEMARK AP&CC

American Potash & Chemical Corporation

3030 West Sixth Street, Los Angeles 54, Calif. | 99 Park Avenue, New York 16, New York

market for its sizable output of by-product HCl.

A combination of problems—low yields (it's believed that the plant attained only about half its designed capacity), high maintenance and operating costs—caused the project to fall short of its economic goal. And when the arrival of Allied Chemical's electrolytic caustic-chlorine plant at Brunswick reduced the economic incentive for chlorine recovery, Hercules shelved the operation indefinitely.

Materials Key: Though Technical Enterprises is fully aware of the numerous earlier attempts to sidestep the process snags of the Deacon process, it feels that the Airco process has a better-than-even chance of making the grade. Reason: new materials of construction—not available for the earlier installations—appear to hold the solution of the problem of the extremely corrosive conditions of a wet Cl_2-HCl system. Such materials as Teflon valve diaphragms, new high-temperature and chlorine-resistant rubbers, Pyrex and vinyl chloride piping, furans, epoxies and polyesters, says TE, should go a long way toward reducing maintenance costs.

Another advantage in the Airco process's favor, TE feels, is efficiency and long life of the catalysts. Focusing on the main problem of developing a catalyst capable of making the HCl oxidation go far enough to completion to yield economic quanties of chlorine, Airco came up with a copper catalyst admixed with a number of other materials, which serve as promoters. And to add to catalyst life, Airco devised a new type of reactor, specially designed to overcome the volatility of copper chloride at the reaction temperature.

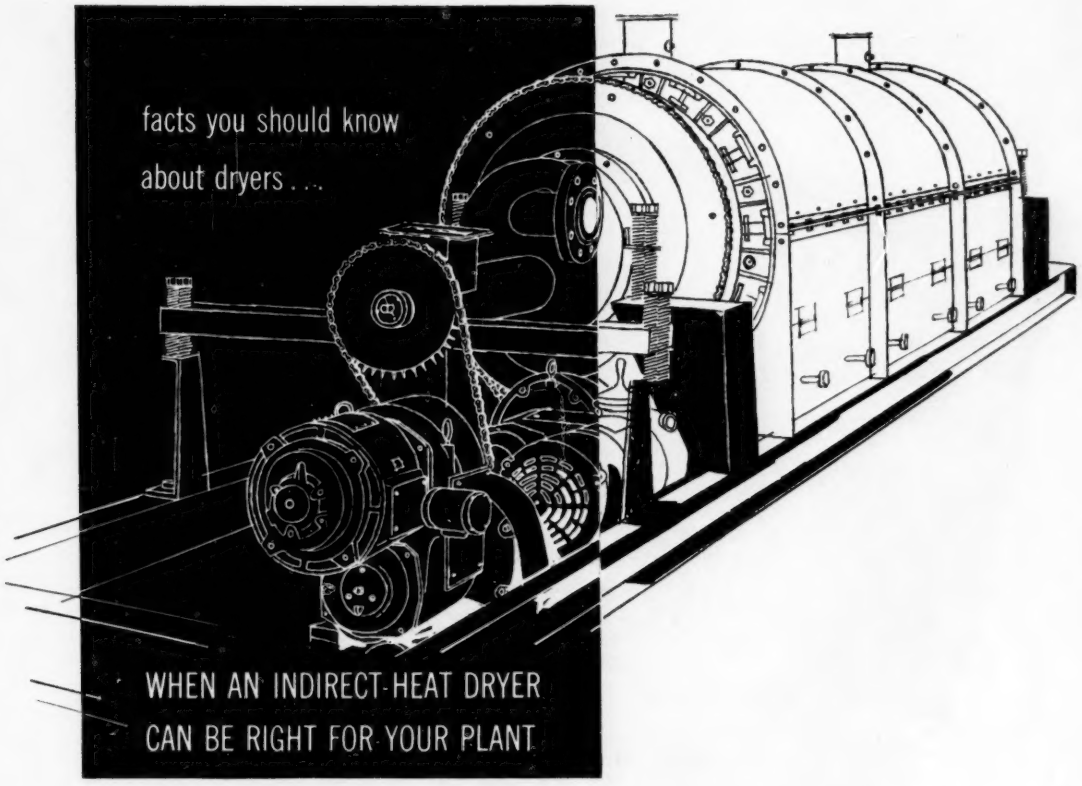
Here's how the Airco process—with variations—works:

Wet HCl (gas) is mixed with air and passed into the catalytic reactor. Chlorine, unreacted HCl and the remaining constituents of the air leave the reactor at about 200 C, pass into a dehydrator for removal of water of reaction. The gas is then transferred

Chlorine Without Caustic–the Costs:

	Plant Capacity (tons/day)		
	10 Tons	40 Tons	100 Tons
Estimated plant cost	$350,000	$800,000	$1,350,000
Estimated production cost (per ton of Cl_2)			
Raw materials*			
Catalyst replacement	$0.50	$0.50	$0.50
Miscellaneous	0.25	0.25	0.25
Operating cost			
Maintenance (4% of plant cost)	4.65	2.65	1.50
Operating labor	7.20	1.80	0.96
Supervision	2.00	0.50	0.25
Chemical control	0.50	0.14	0.12
Utilities			
Electricity @ $0.0125/kwh.	2.00	1.50	1.30
Steam @ $0.75/1,000 lbs.	4.00	3.75	3.50
Water @ $0.05/1,000 gal.	0.33	0.25	0.25
General charges			
Depreciation (10% of plant cost)	10.45	5.97	4.04
Overhead	10.30	4.50	1.92
Interest on working capital			
6% of $50,000	0.90		
6% of $100,000		0.45	
6% of $250,000			0.45
Total production cost per ton of Cl_2	**$43.08**	**$22.26**	**$15.04**

*Assumes that Hcl is available at no cost.



For over 55 years, Louisville Dryers have been solving industry's drying problems and effecting marked economies. The records of this experience can often be applied to specific cases, possibly yours. For example . . .

Q. *My material is a filter cake, practically all minus 325 mesh, and must not contact furnace gases. It can be heated to 500° F. at least, without injury. What type of dryer would do the job best?*

A. You might consider using a direct-heat rotary dryer that utilizes clean, heated air as the drying medium—air heated by steam coils or a gas or oil fired heat exchanger. However, this introduces a considerable dust collection problem. Besides, from a standpoint of capacity, it is inefficient as well as from a heat-cost standpoint. This makes it unduly expensive. Therefore, a type of indirect-heat rotary dryer is indicated which would greatly reduce both the dust problem and the heat cost.

Q. *What is meant by an indirect-heat rotary dryer?*

A. One in which the material to be dried is warmed by contact with the heated metal surfaces, which in turn are heated by the medium used (usually furnace gases or steam). Those using furnace gases are called "indirect fire dryers". Atmospheric and vacuum drum dryers are examples of steam-heated indirect dryers, but the type in greatest use is the steam tube dryer. This is often referred to as the "Louisville Type" because of the thousands of Louisville Steam Tube Dryers built during the past 55 years.

Q. *How does an indirect-heat dryer minimize the dust problem?*

A. In an indirect-heat dryer, only enough air is admitted to carry off the evaporated moisture. Thus, the air has nothing to do with the heating of the material. Generally, this low air velocity results in insignificant dust loss.

Q. *How does this differ from the operation of a direct-heat dryer?*

A. In direct-heat dryers, the hot air furnishes the heat for drying besides removing the evaporated moisture. The amount needed to supply the necessary heat results in a sufficiently high velocity through the dryer to carry out an excessive amount of fine material particles.

Q. *It seems I need an indirect-heat dryer. How can I get competent advice and more information regarding my particular requirements?*

A. The Louisville Dryer engineering staff will be glad to analyze your requirements, arrange for necessary pilot plant tests, and submit an unbiased recommendation accompanied by estimated costs. You incur no obligation by using this service.

PROCESS EQUIPMENT DIVISION GENERAL AMERICAN TRADE MARK

LOUISVILLE DRYING MACHINERY UNIT

GENERAL AMERICAN TRANSPORTATION CORPORATION

Dryer General Sales Office: 139 So. Fourth Street, Louisville 2, Kentucky
Eastern Sales Office: 380 Madison Avenue, New York 17, New York
In Canada: Canadian Locomotive Company, Ltd., Kingston, Ontario, Canada
General Offices: 135 S. La Salle Street, Chicago 90, Illinois

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E. I. DU PONT DE NEMOURS & COMPANY
WILMINGTON, DELAWARE, U.

Du Pont chemical experience is the reason...

You get unvarying high quality in every bag of Du Pont Adipic Acid

Du Pont, the chemical industry's first producer of adipic acid, maintains its high-quality standards with the latest manufacturing processes and production techniques.

You benefit from Du Pont's 20 years of experience as a producer of high-quality adipic acid. For shipment after shipment, you can depend on a product that meets your most exacting specifications . . . whose purity and uniformity are always the same. This means you can count on a smoother-running operation . . . with costly production halts cut to a minimum.

What's more, uses for versatile Du Pont Adipic Acid continue to grow. In addition to applications in many phases of petroleum and chemical manufacture, Du Pont Adipic Acid is widely used in the production of high-quality adipate plasticizers, polyester resins, and polyurethane foams.

If adipic acid is an ingredient in your process, consider the many advantages you gain from Du Pont's experience in producing this basic chemical. Remember, too, that there is a strategically located stock point near your plant ready to ship Du Pont Adipic Acid (packaged in 50-lb. multi-ply paper bags) on receipt of your order. For more information, call or write our nearest district office . . . you will receive a prompt response.

POLYCHEMICALS DEPT. DISTRICT OFFICES

New York 1, New York
350 Fifth Avenue
Tel: Longacre 3-6400

Detroit 35, Michigan
13000 West Seven Mile Road
Tel: Uni. 4-1963

Chicago 30, Illinois
7250 N. Cicero Ave., Lincolnwood
Tel.: Ind. 3-7250

Los Angeles 58, California
2930 East 44th Street
Tel.: Ludlow 2-6464

FORMULA:

$(CH_2)_4\ (COOH)_2$

TYPICAL ANALYSIS:

Adipic Acid	99.8%
Ash	5 p.p.m.
Iron	0.5 p.p.m.
Water	0.05%
Color, A.P.H.A.	6

DU PONT
REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

POLYCHEMICALS DEPARTMENT

E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Delaware

to an absorption-desorption system that takes out the unreacted HCl, returns it as 98%-plus HCl gas to the catalytic reactor.

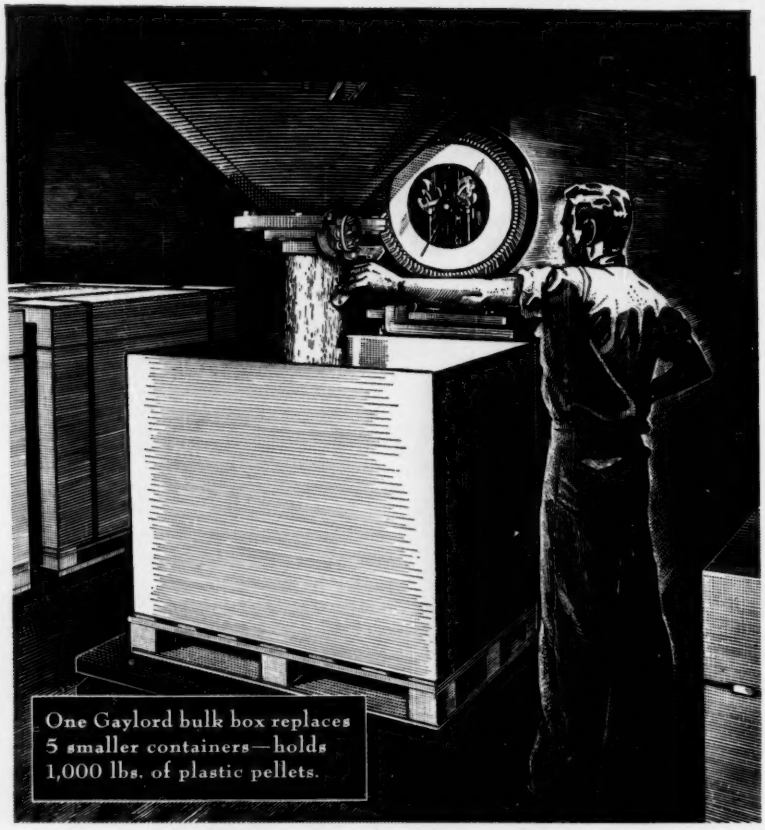
Gas leaving the top of the HCl absorber is saturated with water vapor, contains 25-30% Cl_2 with the balance mostly nitrogen. Chlorine may be separated from the noncondensables by absorption in cold water (or in other selective solvents). The saturated water may then be heated and stripped to yield 99.5% chlorine gas for subsequent drying and liquefaction. Water absorbent, after cooling, is recycled to the absorption column.

With the use of oxygen in the catalytic reaction, several simplifications—particularly in the product absorption-desorption system—are possible. Technical Enterprises has several systems that, it says, are relatively cheap to operate. Others that are commercially available for chlorine recovery:

- Diamond Alkali's method of drying wet Cl_2, absorbing the gas in carbon tetrachloride at 0 F, 100 psig., desorbing by heating and condensing chlorine under pressure.
- Hooker Electrochemical's method of absorbing Cl_2 in cold water and returning it to the water cooler ahead of the drying operation in an electrolytic chlorine plant.

Pilot Production: Following extensive laboratory testing, the Airco process was piloted successfully in a 1-ton/day pilot plant at Baltimore. Results of trial runs:

- Chlorine yields varied between 30-45% per pass, were over-all considerably higher than 90% of theoretical.
- Copper chloride volatility was no problem; catalyst could be expected to last for more than a year, with occasional additions of copper without interruption of the operation.
- Reaction was self-sustaining, required no additional heat at the catalytic reactor.
- Temperatures were such that available materials of construction could be used without fear of unduly high maintenance costs.
- Catalytic oxidation of HCl with oxygen produced a 90%-plus concentration of chlorine gas; with air, a 25-30% Cl_2 product.
- Air oxidation required an efficient, inexpensive absorption-desorption system to separate chlorine from



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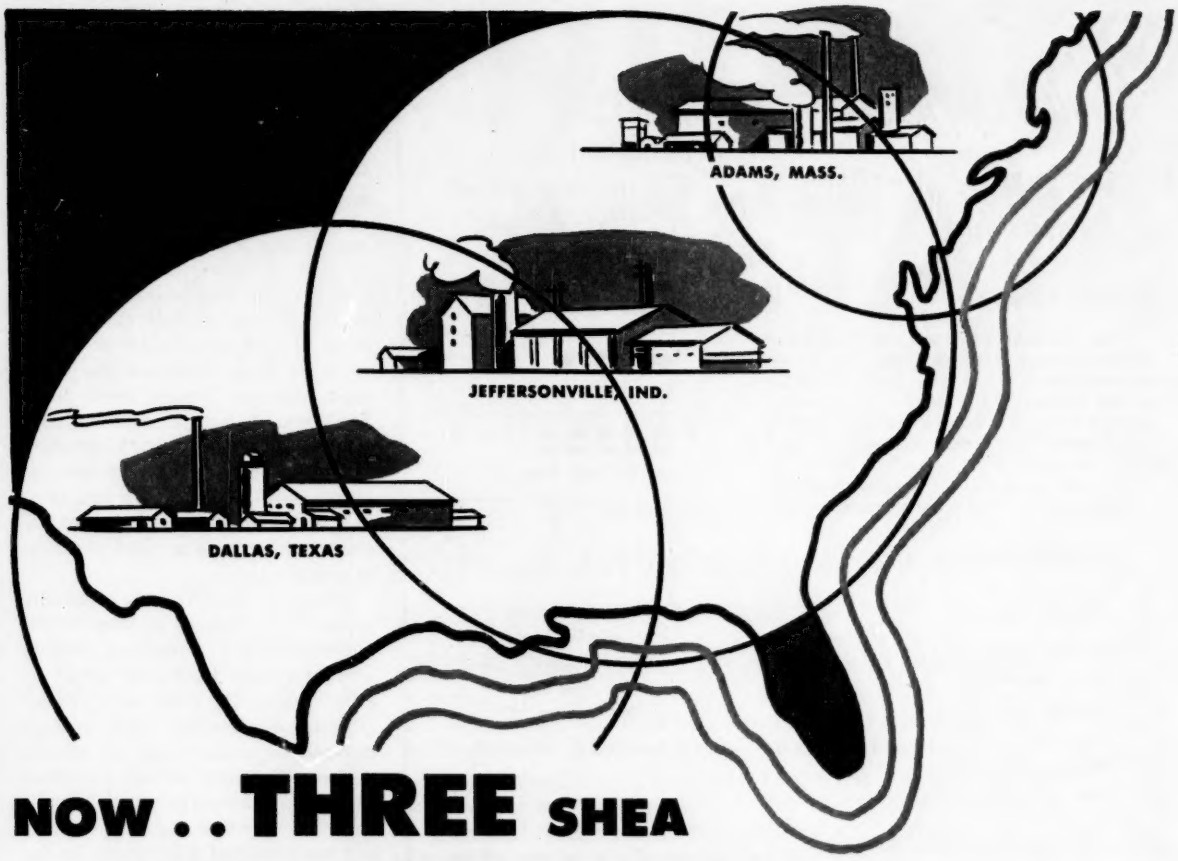

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noncondensables economically.

Projected Costs: Going by the 1-ton/day operation, TE estimates that large-size plants could recover chlorine from by-product HCl for $15-43/ton (*see table, p. 76*) by the air oxidation route. This assumes, of course, that the chlorine unit would be tied in with existing processing facilities, that HCl is available (either as vapor from organic chlorinations or as 31-35% solution) at no cost.

Under these conditions, the investment required ranges from about $35,000/daily-ton of capacity in a 10-tons/day unit to $13,500/daily-ton of capacity in a 100-tons/day plant. And, as TE points out, that's only about one-third to one-sixth the cost of an electrolytic plant of similar capacity.

Matter of Time: In addition to variations of the Deacon process, several other methods of producing chlorine without caustic have been proposed. Ethyl Corp., Du Pont and National Distillers & Chemical Corp. produce chlorine as a coproduct of metallic sodium; Westvaco piloted a method of making chlorine by the electrolytic reduction of cupric chloride; and Allied has employed a technique involving the reaction of salt with nitric acid to yield chlorine, sodium nitrate and nitrosyl chloride.

But with the continued growth of by-product HCl (it accounted for 64.5% of the 911,430 tons of HCl produced last year), it's probably only a matter of time until someone decides to give the Deacon process another try.

PROCESSES

Beryl Cuts Losses: Use of beryl as an additive to decrease burning losses in casting aluminum-magnesium alloys is being tested by Oesterreichische Aluminium Werke Ranshofen (Austria). Small additions of beryl are said also to produce smoother, cleaner casting surfaces.

•

Pressing Aid: The state-owned East German Elektroinstallation Ruhla (Middle Germany) reports a new method of improving mechanical and electrical properties of pressed plastics. High-frequency preheating of isopressmasse (based on phenol, cresol) is said to reduce both pressing time (by 50%) and pressure required.

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Insoluble Matter	0.010%
pH of 20% Solution at 25°C.	3.0-4.0
Substances not precipitated by H_2S (as SO_4)	0.30 %

Color—White

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Powder

$Pb(C_2H_3O_2)_2.3H_2O$ — F. W. 379.35

Assay ($Pb(C_2H_3O_2)_2.3H_2O$)	99.0-105.0%
Insoluble Matter	0.020 %
pH of 5% Solution at 25°C.	5.5-6.5
Substances not precipitated by H_2S (as SO_4)	0.20 %

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On the Outside Looking In

Peering deep into the heart of an atomic reactor is no trick at all for technicians at Brookhaven National Laboratories. They simply open an access tube and insert a borescope, specially designed for the job by National Electric Instrument Co. (Elmhurst, N.Y.). A king-size version of instruments used for medical examination, the borescope resembles a periscope with a built-in flashlight. Produced in various sizes to 40 ft. in length, it's also used for inspecting the interiors of boiler and condenser tubes, welded pipe and tubing, distillation apparatus, other equipment where remote viewing is required.

Another deep-hole viewing device has been developed by Grundig Radio-Werke GmbH (Fuerth, Bavaria) in cooperation with engineers L. Mueller (Salzburg, Austria), J. Hunger (Kiel) and Winifred Petri (Munich). Intended to permit direct studies of small borings to 1,000 ft. deep, it incorporates a miniaturized television camera — reportedly the smallest ever made—in a small probe connected to a flexible cable. The probe is equipped with a motor-driven revolving mirror on a flexible shaft.

The probe may be used, it's claimed, in borings of 2.5-in. diameter, regardless of direction or straightness and even if the hole is filled with water.

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25°C:	0.978
Weight per U.S. Gallon at 68°F:	8.19 lb.
Coefficient of Expansion:	0.00093 per 1°C
	0.00052 per 1°F
Refractive Index, n_D at 20°C:	1.424
25°C:	1.422
Viscosity at 25°C:	3.41 centipoise
85°F:	38.6 Saybolt seconds
Latent Heat of Vaporization:	55.1 cal/g
Specific Heat	0.43 cal/g
Dielectric Constant at 30°C	7.97
Flash Point, Cleveland Open Cup:	249°F
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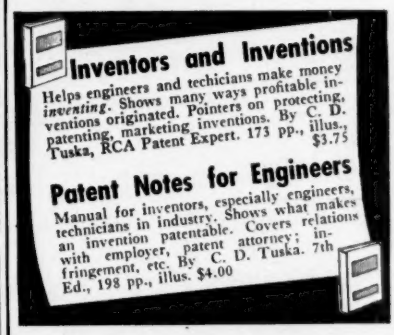
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Irradiation Tricks

Some of the processing tricks that impart improved strength and temperature-resisting properties to irradiated plastics are disclosed in an Australian patent application (21323) describing the highly touted Hyrad process developed by Sequoia Process Corp. (Redwood City, Calif.). A means of improving the electrical insulating properties of polyethylene (*CW, May 5, '56, p. 46*), the process was subsequently licensed by W. R. Grace. Grace has expressed an interest in its application to containers, piping, other plastic items (*CW Technology Newsletter, Oct. 27, '56*).

The modified plastic properties produced by the Hyrad process are the result of a cross-linking of polymerized chains that make up the resin. According to Sequoia's application, the cross-linking is induced by moderate doses of high-energy radiation (1×10^6 to 1×10^8 roentgens equivalent physical), may be enhanced by subsequent thermal treatment of the plastic at 130-160 C.

Chemical Bridges: Though Sequoia reports that the mechanism leading to the formation of polymer cross-links is not fully understood, it's believed that chemical additives employed as bridging agents, or their reaction products, actually become a part of the cross-linking bridge. This phenomenon appears to be enhanced by heat aging.

The additives are described, generally, as elements or compounds that are compatible with the plastic resin and which contain an element selected from Group V or VI of the periodic table, and certain organic compounds not containing these elements. The latter may be vulcanization accelerators, such as mercaptothiazoles, thiuram sulfides, guanidines, selenium diethyl dithiocarbamate and amine-aldehyde reaction products. Also, conventional antioxidants, such as diphenyl-*p*-phenylenediamine, Ionol, phenyl-α-naphthyl amine, diarylamines and ketone reaction products of arylamines, may be added.

In the preparation of foamed cellular plastics, blowing agents (e.g., disulfonyl hydrazides) may be employed to provide both the nitrogen required for blowing and precursors of cross-linking agents. If desired, the irradiation treatment may precede the blowing operation.

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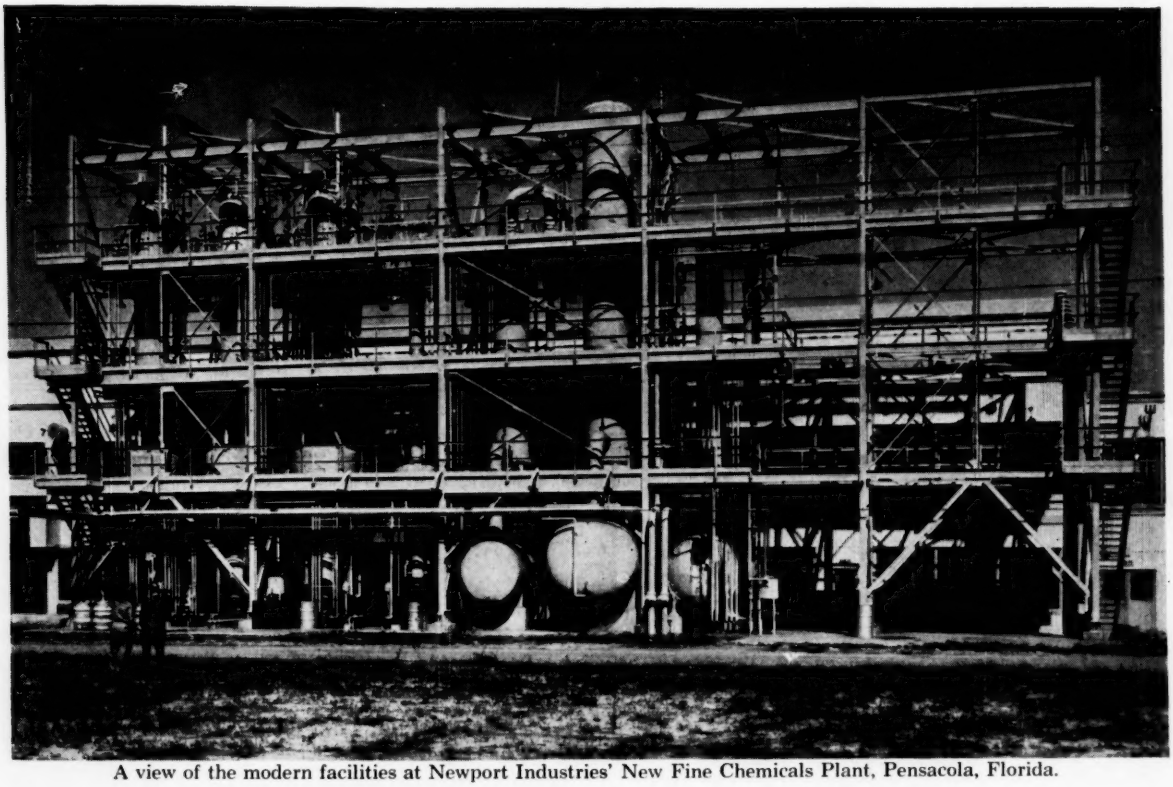

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